Supervisors' emerging role in second-generation knowledge management.

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1.0. Introduction

My study examines a supervisor work and knowledge management in technical customer service division of large Finnish telecommunications company called 'Telecommunication Corporation'[1] (TC). TC is a large provider of telecommunications services in Finland. TC had been coping with several challenges that the rapid development and change in products, technology and customer needs had created for the strategic management of the business and organization of supervisors' work in company's technical customer service division (TCS). TCS is responsible for the installing and maintenance of telephone and digital modem connections. As an endeavor to solve and meet with the challenges that the speed of change had brought, the company decided to start a second-generation knowledge management project, called 'Competence Laboratory', to develop supervisors' work.

The empiric data for my study comes from that developmental intervention project, which was conducted during spring 2000.

2.0 Supervisors' reflections about their changing role

Rapid technological changes and transformation of work qualifications has have its impact on supervisors' emerging role, technical mastery seems not to be the point anymore. A supervisor reflects:

"Traditional supervisor at that time then, say, ten years ago managed the work in the field, participating in some special tasks. He could also master the technique. Not anymore, though; the time has gone ahead of us in the technique. We know only partially, how they install that digital modem card. I knew before how to program the older digital modem -card, but not anymore and I do not need to." (Supervisor, 1st meeting.)

The model of supervision implemented top-down appears inadequate due to changes in organization's environment, such as high market competition which has its effects on the organizational structure and competitiveness. Service development chief comments that it seems that the new role of the

[1] The name is a pseudonym.

supervisors has to be formed from grassroots, taking into account the complex situation and changes due to rapid markets and product life spans:

"I am about to notice in this supervisors' work a nostalgic and historical breeze. The future will show was it so, but it seems that there is an era of leadership culture coming to an end, an era that begun somewhere in year 93. At that time, the coach-model was formed when the consults (outside company) and engineers (within the company) brought it to us. Now this new model is structuring totally differently, by our own ideas and thoughts: we will construct it to function. This emerging of a new model started when our new division chief came into the company. Meanwhile the rapid technological change began transforming the environment so much that the coach-model emerged inadequate. That is because the coach model was built in to a situation where you (supervisors) had a small team that you saw each morning. Moreover, you were spread out around (...)Now half of those regional offices are closed and one is being integrated in a bigger and bigger group; now there are only four of these main teams plus four specialized teams. Thus, the environment has changed tremendously and it creates this anguish of the leadership model not fitting into the new situation." (Service development chief, 6th competence laboratory session.)

Supervisors need not to know everything but they bring together those who know, acting as mediators establishing the knowledge flow between their subordinates and experts. A supervisor describes his work as actively participating into a brokering process, bringing actors together from several expert-worlds:

"Supervisor enables and takes care of contacts to the (cooperation) network making those connections to run in all levels. Nowadays the supervisor deals those networking scopes. If any of our fellows has a specific problem (technical or such) we find out who deals with such problems and we notify that some of our fellows (subordinates) will be contacting him/her." (Supervisor in the third competence laboratory session)

A supervisor comments that the dispatchers (supervisors' subordinates) role has become more autonomic and gained more responsibility, the level of decision-making has lowered and the decision-making process has changed:

"Dispatchers deal with all the routines of installers. (...) the dispatchers have to delegate bit similar affairs that we (supervisors) used to deal with." (supervisor in the 3rd competence laboratory session)

Service development chief of the division comments that mastery in technique is not possible to achieve anymore but instead general and holistic understanding is needed:

"The situation has changed in the way that each of us still 3 or 4 years ago mastered the jobs of your subordinates. Now we have gone into a new situation; we should obtain rather big leap in this technical level of knowledge. We ought to obtain a kind of quantum leap in order to understand what is going on." (Service development chief, 6th competence laboratory session)

3.0 Is knowledge management an answer to new challenges of learning?

3.1 What is knowledge management anyway?

Literature review on knowledge management quickly shows the problematics in knowledge management both in conceptual definitions and in its objectives and unit of analysis. Authors seem to give opposing definitions about it. Some speak merely on coding and measuring knowledge as intangible asset that an organization can exploit focusing on individual as the unit of analysis and conceptualizing knowledge as an objective and easily measurable (Davenport & Prusak 1998; Sveiby; see also Malhotra 2000; Zack 1999). Others maintain that knowledge management is closely related to learning organization and it should capture new knowledge created mainly from individual tacit knowledge taking account also the social aspect of knowledge (Nonaka & Takeuchi 1995). Some maintain that knowledge management is about capturing knowledge embedded in collective practices, taking community of practice as the unit of analysis; most recent example on this is Wenger's (2000) article in Harvard Business Rewiev. However, what is common to most writers on knowledge management is that they consider knowledge a potential competitive advantage of an organization, as theories of organizational learning and learning organization. Knowledge management is a multi-scientific endeavor: that is, it fundamentally lacks a common and shared intellectual community due to a fact that it is approached from several different scientific communities, such as strategic management practitioners, economists, organization scientists, information scientists or pedagogues and does not have established conceptual content.

3.2 What are new challenges for learning?

First of all, I must ask what are these new challenges of learning?[2] The answer can be found for example taking a glance towards the situation in Telecommunication Corporation or into another telecommunication companies in similar situation: Mere traditional training or consultation services brought to a company from outside are not itself adequate during the rapid discontinuous[3] change in technologies and products. Furthermore, through learning faster and gaining rapidly new knowledge on future products and technologies a company can be one step ahead from its rivals. To obtain this is the major challenge for learning; learning has evolved into strategic issue in keeping up with competitors during an era of rapid changes in the competitive environment. As a result, strategic management is now required to take learning under consideration as a strategic asset.

Thus, this challenge of learning has implications, and focuses mainly, into strategic management: Into what can strategic management be based on when production, technological innovations, and new product developments organize derived from changing customer needs in flexible and co-configurative[4] manner? When learning should be nurtured and further developed? Before such challenges, strategic advantage in markets was gained through products and customer relations that rivals lacked. In the past somewhat structured and predictable business environment rewarded large firms whose competitive advantage was based on high level of efficiency of scale (Malhotra 2000). Now the major challenge is how to learn more efficiently to be able to exploit and rapidly put to practice such knowledge and competence that includes future opportunities, of which the knowledge management literature still lacks to a great extent. "The ability of an organization to learn, accumulate knowledge from its experiences, and

[2] Note that I focus here on organizational learning, not into learning in terms of classroom in which the challenges are somewhat different.
[3] Here I refer to Nadler & Tushman's (1995) conceptual definition of discontinuous change.
[4] Term implies into an ideal-typical historical type of production outlined by Victor & Boynton (1998); see also Engeström (1999c) on new forms of organizing work in this type of production.

reapply that knowledge is itself a skill or competence that, beyond the core competencies directly related to delivering its product or service, may provide strategic advantage." (Zack 1999b, xi) Furthermore, flexibility is also needed since the future prospects themselves may also rapidly change. As I will later elaborate more, this is also one of the major challenges in supervisors' work and motive for emerging new role. In conclusion, the challenges of learning focus into how work practices of supervision work and top-management as well as into the front-line customer surface.

3.3 Overview into major solution endeavors

In knowledge management literature one can find three viewpoints that have emerged while solving these challenges of gaining competitive advantage through strategic management and learning[5], 1) information processing approach, 2) core competencies, and 3) new knowledge creation. I shall first delineate these major viewpoints. Subsequently, I shall present a fourth perspective as an answer into those questions that other major viewpoints in knowledge management literature fail to answer. The fourth perspective, which I review in the next chapter, is named second-generation knowledge management based on definitions by Ahonen, Engeström & Virkkunen (2000).

(1) Core competencies

First standpoint starts from the concept of the core competencies of a firm outlined by Hamel & Prahalad (1990). According to their view, management's objective is to "consolidate corporate wide technologies and production skills into competencies that empower individual businesses to adapt quickly to changing opportunities." (Hamel & Prahalad 1990, p. 82.) Firms' competitive advantage therefore flows from its unique knowledge compared to competitors. Along with these, management should be able to see and

delineate the correct competencies and technologies that guarantee competitive advantage in future. Hence, these core competencies are corporate resources that the corporate management reallocates. (idib.) Especially middle managers should be then able to redistribute these resources to fulfil top-management strategic objectives.

Core competence is a combination of different technologies and competencies within a firm. It is organizational level collective property not something that single individual could possess. However, most methods developed for managers to capture and reallocate the core competences of their firm are surveys of individual's competencies which are evaluated using objectified and pre-designed measures. These surveys thus implicitly already have a presupposition of the kind of competencies that the individual might uphold. They do not take into account competencies and knowledge embedded in practices (Lave & Wenger 1991; Brown & Duguid 1991; Wenger 2000; Wenger 1998), or knowledge mediated by and embedded in social and material artifacts (e.g. Engeström 1987; Leontjev 1977). Spender (1999, p. 65) has criticized core competence as a too simplistic model attributing advantage to a single source thus considering core competencies only little more than mere tautology. Firm's competitive advantage does not arise from single source but from different types of tacit and explicit knowledge and from different types of people (ibid). It is also argued that core competence as such does not explain competitive advantage (ibid.). Finally, Leonard-Barton (1995) maintains that the discontinuous change in products and technologies can also evolve into that today's core competence may evolve into tomorrows core rigidity.

(2) Information processing approach

[5] Still the most dominant view in the knowledge management literature is based on information processing paradigm, in which a positivistic stance to knowledge is considered (Malhotra 2000, see also Tuomi 1999).

Second major point of view in knowledge management that has aimed to solve challenges in strategic management and learning is the information processing approach. It considers that organization's ability to adapt changes in its environment and market is based on such knowledge that may be stored into information systems and transferred using databases and information retrieval systems. Management's task is therefore to build up such information system that enables transfer and storage of firm specific explicit knowledge. This so-called information processing view of knowledge management originated in the era when business environment was more stable, and products and core competencies had longer life scale and future could be predicted. (Malhotra 2000.) However, this model is inadequate in the e-business era characterized radical change in business environment. (ibid.) Moreover, information processing paradigm assumes that all relevant knowledge in organization can be measured, is objective, can be codified and is static and objective for codifying. It is a positivistic and technical orientation into knowledge. In other words, it presumes that organization functions through specific tasks that can be easily predicted, controlled, and captured; metaphorically, it presumes organization as a machine whose behavior can be both predicted and controlled. Management's task is to map and capture individuals' competence (for e.g. Zack 1999) and knowledge in a way that enables its use across the organization for increased/greater competitive advantage.

Several authors and attempts to develop knowledge management tools have been mostly criticizing information processing approach (Brown & Duguid 1991; Boland & Tenkasi 1995; Malhotra 2000; Magalhaes 1999; Nonaka & Takeuchi 1995) that seems to have been the dominant aspect in knowledge management thus far. Following endeavor to solve the challenges of learning is also part of the criticism against information processing approach, and takes us towards notion of second-generation knowledge management.

(3) New knowledge creation

In the third perspective, creating new knowledge is considered to bring most important competitive advantage (Nonaka & Takeuchi 1995; also Spender 1999; Brown & Duguid 1998). Instead of transferring, exploiting, and mapping existing knowledge, organization's management should ensure such an organizational environment that enables new knowledge creation. Keeping this in mind positions middle managers into important place; they act as concretizing mediators between top-management strategic visions and front-line's experiential and practical knowledge (Nonaka & Takeuchi 1995), as is described elsewhere in my study. This so-called knowledge-based view of the firm suggests that it is knowledge that holds firms together instead of transactions. (Brown & Duguid 1998.) Knowledge embedded in information systems is merely one form of knowledge in which explicitly stated knowledge may be combined with other explicit knowledge (Nonaka & Takeuchi 1995).

Beyond the explicit and articulated knowledge in databases exists also contextual individual or social tacit knowledge (on different forms of tacit knowledge see Spender 1999; see also Virkkunen 2000a on critique of Nonaka & Takeuchi's treatment of Polanyi's concept of tacit knowledge). This transfer of individual tacit knowledge into explicit knowledge is not a technical matter as information processing paradigm might presume; it is a social question of how tacit knowledge is articulated, or made explicit in narratives (Magalhaes 1999). Moreover, a question of sense-making makes knowledge stored in information systems highly problematic from the point of view of knowledge-creation (Malhotra 2000) and knowledge created in practices and organizational communities (Boland & Tenkasi 1995).

Until now individual vs. collective dichotomy in knowledge creation and knowledge management has manifested itself in knowledge management theories that have been giving more weight on individual as the prime carrier of knowledge (see Nonaka & Takeuchi 1995); knowledge is thought to evolve

from individual tacit knowledge towards collective explicit knowledge. Nonaka & Takeuchi still maintain that "in a strict sense, knowledge is only created by individuals (1995, p. 59)." However, lot of strategically important knowledge is also embedded in non-articulated work practices, communities of practice (Lave & Wenger 1991; Wenger 1998; Wenger 2000) and material and social artifacts (Engeström 1987; Ahonen, Engeström & Virkkunen 2000). The knowledge conversion process does not therefore finish into 'from individual towards collective' but is individual-collective-individual: That is, knowledge creation occurs also when individuals apply collective concepts, tools, guidelines and other artifacts in their work practices. Knowledge is hence partly embedded in work practices (Lave & Wenger 1991; Wenger 1998; Wenger 2000), partly in social and cultural artifacts (Engeström 1987; Ahonen, Engeström, Virkkunen 2000). Second-generation knowledge management, which I describe in the next chapter, goes further from the individual centered theories focusing more into the question of social vs. individual knowledge and learning.

4.0 Second-generation knowledge management[6]

The second-generation knowledge management goes nearest in solving the major challenges in knowledge management. It focuses more into knowledge embedded and constructed in collective practices and thus goes one step further away from information processing paradigms which have been inadequate in explaining and solving the question of collective knowledge creation and maintenance. It tries also to solve the contradiction that core competencies focused on organization level competences but tools to capture that collective competence were individually centered methods. The first generation knowledge management used, 1) the knowledge-carrying

[6] Second-generation knowledge management is more like a definition towards what knowledge management scholars have been arguing so far and what are the central questions now; Especially competence laboratory as a tool brings us conceptually and practically sound second-generation knowledge management method to capture different

individual as the unit for mapping and enhancing knowledge, 2) defined knowledge in terms of discrete skills that can be codified and measured, and 3) used outsiders external point of view in analyzing knowledge and competence. *The second-generation knowledge management considers the knowledge as embedded and constructed in collective practices*. (Ahonen, Virkkunen & Engeström 2000.) Therefore, the unit of analysis in second-generation knowledge management is community of practice or innovation networks (Ahonen, Virkkunen & Engeström 2000; about communities of practice see Wenger 1998; Wenger 2000; Lave & Wenger 1991; Brown & Duguid 1991). The concept of "ba" a space which enables individuals to share and create knowledge presented by Nonaka & Konno (1998), is also related to the notion of communities of practice (Engeström 1999a, 3), and competence laboratory method that aims to create a knowledge-creation 'ba'. *The objectives of second-generation knowledge management is to create new knowledge*. Knowledge creation is made possible by collective learning actions (Engeström 1987) that are taken, and provoked, in an organization (more elsewhere in my study). These learning actions are also needed for new concept formation (ibid.). From the point of view of second-generation knowledge management, previous ideas suppose that it would also mean creation of a new concept of supervisor role. Figure 4.1 illustrates transition towards second-generation knowledge management and this conceptual framework.

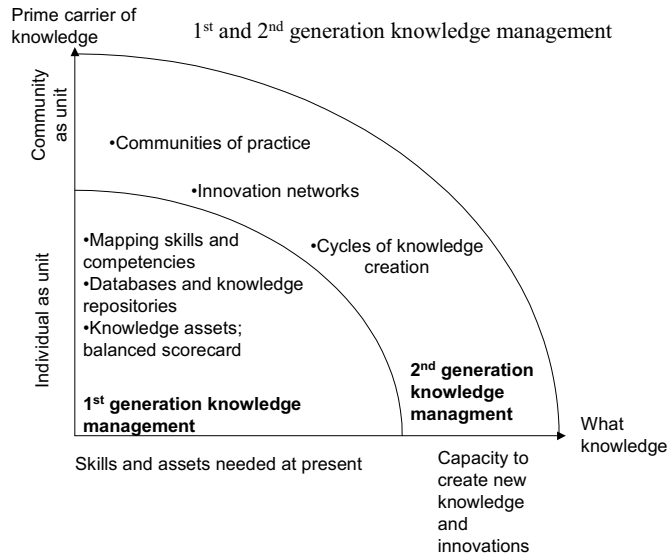

Figure 4.1 Two generations of knowledge management (Ahonen, Virkkunen & Engeström 2000 p. 3).

Conclusively, the first-generation knowledge management was based mostly into information processing view while the second-generation has been based in some extent into a critique of the former. The figure 4.1 summarizes the two generations. Transition to the second generation does not imply abandoning all the tools developed in the first generation - it is a stepwise shift in emphasis and interest rather than an abrupt break.

4.1 Social theories of knowledge and competence

As the figure of two generations of knowledge management shows, a community of practice and innovation networks, that is, social cooperation construct units of analysis in the second-generation knowledge management. Also these collective practices have the capacity to create new knowledge and innovations. Wenger (1998, p. 251-252) notes that communities of practice are the social fabric of learning. Communities of practice play an important part in the development of new competencies, since they keep the tension between experience and competence alive (ibid.). Community of practice leans on to the presupposition that learning is viewed

as a situated activity. It is a social and anti-structuralism view into learning; agent, activity and world cannot be divided and separated as in behaviorist-structuralism learning theories since they constitute each other. Lave & Wenger (1991, 29) summarize the conceptual background as follows: "Learning viewed as situated activity has as its central defining characteristic a process that we call legitimate peripheral participation. By this we mean to draw attention to the point that learners inevitably participate in communities of practitioners and that the mastery of knowledge and skill requires newcomers to move toward full participation in the sociocultural practices of a community." (Lave & Wenger 1991, 29.)

Lave & Wenger point that even general knowledge only has power in specific circumstances (ibid. 32). Moreover, they argue that general knowledge can be gained and brought to play in in specific circumstances (ibid. 34). Community of practice has on its back a presupposition that learning is an integral aspect of all practice; learning is not just something that happens on a training seminar, but which occurs every day. This is also what legitimate peripheral participation stresses; it is a "descriptor of engagement in social practice that entails learning as an integral constituent. (Ibid. 35)" Finally, community of practice is a shift away from a theoretical presupposition in which learning is reified as a one kind of activity that can be separated from every-day practices. It is a suggestion "towards a theory of social practice in which learning is viewed as an aspect of all activity." (Ibid. 38) The competence laboratory (presented later) is kind of manifestation of a community of practice, it attempts to combine work and learning in fruitfull way while capturing knowledge embedded in practices.

Community of practice is rather novel term in the field of adult education and organizational learning (about most recent publication see Wenger 2000). It has born as an opponent towards the individual centred positivistic learning paradigms, which understood the learning in terms of transmission of explicit and abstract knowledge in classroom environments where the

learning was separated from work. It has its roots in theories of situated learning (see e. g. Lave & Wenger 1991, p. 14) and situated cognition (ibid) in which the focus is on the relationship between learning and the social situations in which it occurs. One of the questions that the current discussion on communities of practice has put less weight on, is the point what Lave & Wenger (1991, p. 42) stress: "The concept of community of practice is left largely as an intuitive notion, which serves a purpose here but which requires a more rigorous treatment. (Italics by Mäkinen)" The previous quote sheds light to the fact that communities of practice are not a theoretical concept with dynamical inner tensions like, say, activity theoretical structure of activity, which has its inner tensions as a concept (see Engeström 1987, p. 82). This makes it more challenging to deal with this notion from researcher's point of view and at the same time trying to give this "rigorous treatment" for the concept, though there lays a danger; one must keep a critical distance to the concept not to swallow the term as a ready-made and taken-for-granted construction.

Boland & Tenkasi (1995, p. 351) use "Community of Knowing", as critique against static information processing approach, to illustrate community of specialized knowledge workers in organizations with specialized technologies and knowledge domains. Knowledge intensive firms, such as Telecommunication Corporation, are composed of multiple communities of knowing with highly specialized technologies and knowledge domains. Boland & Tenkasi (ibid.) propose as an example of community of knowing an online group-ware environment. What is left unclear, though, is that how explicit, formal, and static this community of knowing is? Obviously, such a community of knowing seems rather formal-like, and static, quite oppositely to communities of practice that are multiple and informal, as well as quite ambivalent. Furthermore, it is highly visible that communities of knowing are formed from the basis of what the members "know", however communities of practice are defined in terms of "doing".

Community of practice and community of knowing are attempts to solve the issue of collective knowledge creation and maintenance, though they fail to notice that these practices are historical constructions. That is, they manifest through historical artifacts, which mediate also knowledge in an unarticulated and tacit way. Activity theory focuses of knowledge creation and knowledge management taking into account the context specific and historically and culturally through artifacts mediated nature of knowledge. All the three solution endeavors to solve the strategic challenges of learning in knowledge management hitherto ignore or neglect these questions since they take individual as their prime unit of analysis and comprehend knowledge as objectified and not context sensitive. Moreover, they neglect to notice also the role of language, articulation, and language games in the knowledge creation and maintenance[7].

Nonaka & Takeuchi's (1995) middle-up-down management model is one attempt to solve the problem of collective knowledge maintenance and creation. Nonaka & Konno (1998) have used a concept of 'ba' to illustrate social and situated nature of knowledge creation. For Nonaka & Konno 'ba' is the ultimatum for knowledge management, they consider 'ba' as the "shared space that serves as a foundation for knowledge creation." (Ibid. p. 40.) Community of practice is also another central concept in second-generation knowledge management framework. The notion of a community of practice was originally presented by Lave & Wenger (1991) in their book "Situated Learning: legitimate peripheral participation". It was a step away from mechanistic and individualistic learning and competence theories that had a strong positivistic and individual centered connotation, as an attempt to see competencies and learning as systemic, situated and interrelated. Lave (1996, p. 150) has also pointed elsewhere that: "Wherever people engage for

[7] Except some autopoietic approaches to knowledge management (see Magalhaes 2000) though they do not consider or analyze the roles of artifacts and collective practices in knowledge creation. However, they focus more into the context sensitive nature of knowledge thus pointing language's importance in knowledge development. Also some other authors (Boland & Tenkasi 1995) have been arguing that information retrieval systems and organization's information systems do not take into account different 'communities of knowing' in organization that maintain themselves through language games.

substantial periods of a time, day by day, in doing things in which their ongoing activities are interdependent, learning is part of their changing participation in changing practices." The notion of communities of practice takes us closer to the collective nature of knowledge. As Brown & Duguid (1991, p. 48) maintain, "the central issue in learning is becoming a practitioner not learning about practice. This approach draws attention away from abstract knowledge and cranial processes and situated it in the practices of communities in which knowledge takes on significance." Knowledge is embedded in collective practices that communities uphold. As an example Brown & Duguid (1991) mention Orr's study on copier machine repairers who tell 'war stories', narratives, about difficult repairing cases. Through these narratives, they create and transfer new knowledge about their practice of copier repairing. Community of practice, 'ba', and other social theories of knowledge are not enough itself, since they neglect to notice the systemic and interrelated nature of knowledge, and around what practices are constituted; that is, what is the object of activity, and through what inner tensions practices, and knowledge in communities of practice develop and transform. Activity theory sees the object of activity as the constituent aspect of practices. In terms of activity theory knowledge is embedded both into material and social artifacts. According to activity theory, knowledge is mediated also through tools, signs (material artifacts) and language (social artifacts) (Leontjev 1977; Vygotsky 1978), and is embedded into collective historical practices (Engeström 1987).

5.0. Supervisors changing role

Role is conceptually rather laden word and to avoid misconceptions I will briefly refine my standpoint into this rather central term in my study.

5.1 What determines a role?

Role is conceptually widely used in several social science disciplines having multiple meanings. Biddle (1979, p. 56-57) lists ten general definitions of how role has been conceived; whether as an identity, a set of characteristic behaviors, a set of expectations, or a behavioral repertoire, among various other (see ibid.). Biddle himself defines role as "those behaviors characteristic of one or more persons in a context." (ibid. p. 58). I do not examine supervisors' expected position in a group or their behavior, nor personal characteristics as in psychology-driven trait approach of leadership theory (e.g. Northouse 1997), nor how their behavior patterns manifest in different work contexts. All previous definitions pay no attention to that role also has an object towards what it is formed and changes as the object changes. They see the role as depicted in the figure 5.2, constituted as subject in relation to community, division of labor and rules:

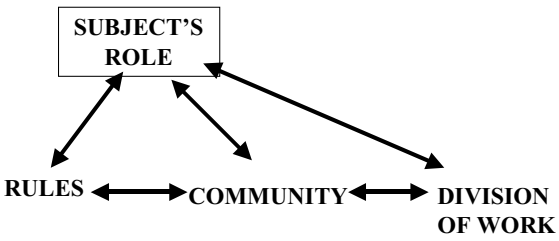

Figure 5.2 Role constituted by expectations within a community

In conclusion, role is determined by the rules and expectations of a community and the way work is organized in a specific work community, team or such, in a given time.

5.2 Supervisors' role as determined by the management system

Hence, according to traditional social psychological or sociological theories, a subject's role constitutes of community's expectations (see e.g. Biddle 1979), which in turn may be based on division of labor and manifest in rules of that community as depicted in the previous figure. Mere conventional understanding of role does not take into account the complex and systemic nature of human activity. Role should be conceptualized from the perspective of motive and object of work, since the subject within an activity system is in large extent defined through the object of the activity (Leontjev 1978; Engeström 1987). In my study role is therefore considered as an activity system (on activity system see Engeström 1987), a systemic whole that cannot be reduced into behavioral patterns or a characteristic of person in context. Figure 5.3 illustrates Engeström's (1987, p. 78) structure of activity, demonstrating how the role (that is actor within activity system) as a systemic whole with its inner dynamics and contradictions is conceived in my study.

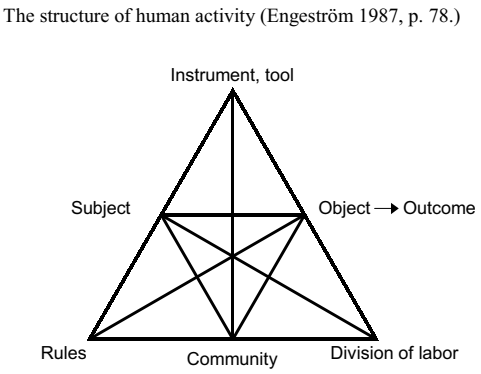

Figure 5.3 The general model of an activity system (Engeström 1987, p. 78)

Hence, according to traditional social psychological or sociological theories, a subject's work role constitutes of community's expectations (see e.g. Biddle 1979), which in turn may be based on division of labor and manifest in rules of that community as depicted in the previous figure. Mere conventional understanding of role does not take into account the complex and systemic nature of human activity. Role should be conceptualized from the perspective of motive and object of work, since the subject within an activity system is in large extent defined through the object of the activity (Leontjev 1978; Engeström 1987).

Hence, pressures to role changes occur when motive and object of work changes. Role is therefore constructed as part of a complex historically changing activity system. Since the unit of analysis of supervisor role is the actor in the activity system, or management system, I shall next briefly examine how the object of management system has been changing.

Through the 'scientification[8]' of management and Taylor's ideas organizations started to optimize, rationalize and standardize work procedures into explicated tasks and regulations (see e.g. Zuboff 1988; Victor & Boynton 1998; Hirschhorn 1986). This entailed development towards a systemic production in which tasks and work procedures were explicated. Simultaneously also information for the actors in organization to perform and manage these explicated tasks was needed. Middle managers number - who were needed to pass down information from the executive level towards line workers - expanded together with the rationalizing and 'scientification' movement (Zuboff 1998, p. 230). Their function became to manage this explicit 'knowledge base' (ibid.) for workers below. They became authorities in controlling information's interpretation and communication. (ibid. p. 232.)

[8] See criticism on scientification of management in Nonaka & Takeuchi (1995).

When it comes to knowledge management, many authors agree that supervisors are in a crucial position considering knowledge management framework in organizations (for e. g. Nonaka & Takeuchi 1995; Leonard-Barton 1995; Davenport & Prusak 1998; Zack 1999; Bertels & Savage 1998). As Leonard-Barton stresses (1995, xv): "Managers at all company levels and in all functions are gatekeepers for the flow of information and knowledge." Similar points are made from other authors in the field of knowledge management, stressing the importance of supervisors' and managers' position: "Middle managers play a key role in the knowledge-creation process. They synthesize the tacit knowledge of front-line employees and senior executives, make it explicit, and incorporate it into new products and technologies." (Nonaka & Takeuchi 1995, p. 16.)[9] Because of the historical changes in management or not, nevertheless middle managers[10] still hold somewhat 'central' position in terms of knowledge and information they posses and with information flows they come across. Yet, their role and position within a second-generation knowledge management perspective has not so far been examined empirically.

Bertels & Savage (1998, 18) stress that old leadership models simply are not adequate anymore. They maintain rather superficially, that in the new model the leader is a coach or mentor. Moreover, they propose that in the place of traditional hierarchical model where the subordinate works 'for' the boss, "it is more likely that in the new model they work 'with' the boss" (ibid.). Consecutively they see that in the knowledge-oriented leadership model trust and respect are needed. (Bertels & Savage 1998.) One can however ask whether trust or respect are those issues that come up in the changing role. Blackler et all (1998) present a general idea of the evolution in leadership theories showed in table 1.

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[9] Nonaka & Takeuchi concentrate here into manager's role in a product development process, which wasn't the situation in Telecommunication Corporation. Nevertheless, their description is relevant in my instance as well since it highlights the central role of managers in knowledge management.

[10] I use the terms middle managers and supervisors in a somewhat synonymous. Explication of organizational terminology see Minzberg (1979), especially p. 20-21.

	Focus in management	**Leadership model**
Mid 60s until mid 70s.	Managing continuity	Leadership style
Late 70s until late 80s.	Management of transition	Transformative leadership
90s	Managing continuing change	

Table 1 Evolution of management and leadership (adopted from Blacker, Crump & McDonald 1998, 68.)

In their article Blackler, Crump & McDondald do not propose any leadership model for 90s, though it is likely that managing continuing change[11] in a culture of trust and autonomy of subordinates implies coach and mentor - like models. Also Victor and Boynton (1998) in their presentation of ideal historical types of work also have similar views about how management's tasks has been changing throughout the historical types of production. In craftwork the manager, or supervisor, was considered as master who maintained superior tacit knowledge on how the work procedures should be conducted. Subordinates learned this through socialization, moving gradually from observing of the work tasks into actual center of doing the practices based on master's teaching and tacit knowledge that they internalized through socialization (this is more in detail elaborated in Lave & Wenger's 1991 Legitimate Peripheral Participation). In mass production the management was considered as the one who knew how the work should be done most efficiently. Mass production was based into articulated knowledge and codified rules about how the work tasks ought to be done in most rational manner (see e.g. Victor & Boynton 1998). In process enhancement the managers are seen as coaches both doing and thinking simultaneously (see e.g. Victor & Boynton 1998); that is, they manage subordinates as a team so that work procedures are constantly enhanced and better solutions are thought over.

[11] Note that they write 'managing continuing change' without elaborating how they conceive change. The next chapter deals more in detail with change, specificly as discontinuous change that reframes organization having no clear singular direction.

5.3 Change as the object of management work and supervisor role

Well known theorist of leadership E. H. Schein (1996) also stresses that the only constant thing will be the rate of change, and that new forms of governance and leadership has to be learned (1996, 67). He proposes several characteristics that leaders of the future have to have (ibid, 67-68):

- extraordinary levels of motivation to enable subordinates to go through the inevitable pain of learning and change;
- new skills in analyzing cultural assumptions, identifying functional and dysfunctional assumptions, and evolving processes that enlarge the culture by building on its strengths and functional elements;
- the willingness and ability to involve others and elicit their participation;
- the willingness to share power and control according to people's knowledge and skills.

These characteristics are rather broad, but nevertheless one can see similarities to the view presented in Blackler et all article which focuses on knowledge management framework, while Schein discusses on leadership generally. He (1996, 68) stresses that in the future "appointed leaders will not play the key leadership roles but will be perpetual diagnosticians who will be able to empower different people at different times and to let emergent leadership flourish."

Change management is said to be one of the elements to promote organization's growth and vitality (Nadler & Shaw 1995). Change management is also considered as one of the core organizational competencies (ibid.). It is also through change management that an organization may avoid not to end up noticing today's core competence develop into tomorrow's core rigidity. Organization effectiveness requires that organizations recognize the need for different types of change and manage them accordingly. (ibid. p. 1995.) Change leadership is one proposal for coping with the discontinuous change to nurture competitive advantage in a global competitive environment (ibid.). Nadler & Shaw (1995, p.4-5) list six destabilising events that trigger large-scale changes in organizations:
1) shifts in industry structure and product class life cycle,
2) technological innovation (core competencies of the organization are called into question),
3) macroeconomic crises and trends,
4) regulatory and legal changes,
5) market and competitive forces,
6) growth.
They (ibid.) stress that previous factors call into question organization's most basic strategic issue: who are the customers' of an organization. Their presentation of change leaderhip model is somewhat merely a listing of different factors and they do not provide any theoretically sound model as Nonaka & Takeuchi's (1995) would more likely be. However, their lists are highly relevant in my study. This will be clear to reader especially when reading description and analysis of my data.

Also emerging new CEO (chief executive officer) role during discontinuous change has been discussed (Heilpern 1995). Though CEO and supervisor do not share the same work objective it is notwithstanding worth mentioning that change factors mentioned earlier do have their impact into actors' role also in the change management literature. However, CEO is examined in this literature narrowly as a change agent (ibid.). Also Drucker (2000) maintains

that change leaders are those who can survive 'in a period of rapid structural changes." (ibid, p. 73.) However he does not explicate in any manner the dynamics of change or the actual transformations of organization procedures, which are obviously the object of these 'change leaders.' I argue that supervisors' emerging new role in second-generation knowledge management cannot be reduced into mere change agents, as some publications would postulate.

5.4 Knowledge creation as object of management work and supervisors' role

Nonaka and Takeuchi (1995, 124-159.) have proposed as a part of their theory of knowledge creation in organizations a middle-up-down management model. The model comprises also a proposal for the new supervisor role. The middle-up-down process is one attempt to try to solve the challenge of managing knowledge creation and it clearly shows the importance of supervisors' and middle management's role and task in the framework of knowledge management. Furthermore, their theory is highly useful while interpreting supervisors' emerging role in my study, that is, in second-generation knowledge management.

Nonaka & Takeuchi see the core process for creating knowledge in the group level through dialogues, metaphors and analogies (see Nonaka & Takeuchi 1995, 126). Accordingly, their process is another effort trying to solve the issue of collective knowledge creation. The middle-up-down process stresses the manner how the role of middle managers' must be recognized.

The middle-up-down management endeavors to overcome the contradictions of the simple top-down command-and-control bureaucracy, and the humanistic autonomic, and flat bottom-up management systems. In the middle-up-down management model all the agents within organization are seen as active subjects; individual's importance is not determined by the

location in the organizational hierarchy as in bottom-up or top-down models, but "by the importance of the information she or he provides to the entire knowledge-creating system." (Nonaka & Takeuchi 1995, 151.)

Indeed the book by Nonaka & Takeuchi, The Knowledge Creation Company (1995), could be said to be one of those publications which clearly started the discussion on second-generation knowledge management, since after all it sees the knowledge as collective, the unit of analysis being a product development team or like. The middle-up-down management is their suggestion for organization setting that can best facilitate this creation of organizational knowledge. The authors summarize the design as follows: "knowledge is created by middle managers, who are often *leaders of a team or task force*, through a spiral conversion process involving both the top and the front-line employees. The process puts middle managers at the very centre of knowledge management, positioning them at the intersection of the vertical and horizontal flows of information within the company." (Nonaka & Takeuchi 1995, 127; Italics Mäkinen). What should be pointed here is that the model is focused and developed from product development examples; the model implicitly presumes that the middle managers work with product development teams or such. Moreover, the actual empiric findings[12] of Nonaka & Takeuchi's model come from a research of a product development team; this should be taken into account especially when considering the applicability of the theory. Furthermore, it shows the high importance of middle manager position in knowledge management. The following figure 5.4 illustrates the middle-up-down knowledge creation process.

[12] Although the empiric descriptions they provide for the reader are rather superficial. Moreover, their theoretical proceedings are somewhat vague generalizations of a product development team.

Middle-up-down knowledge-creation process (adopted from Nonaka & Takeuchi 1995, 129).

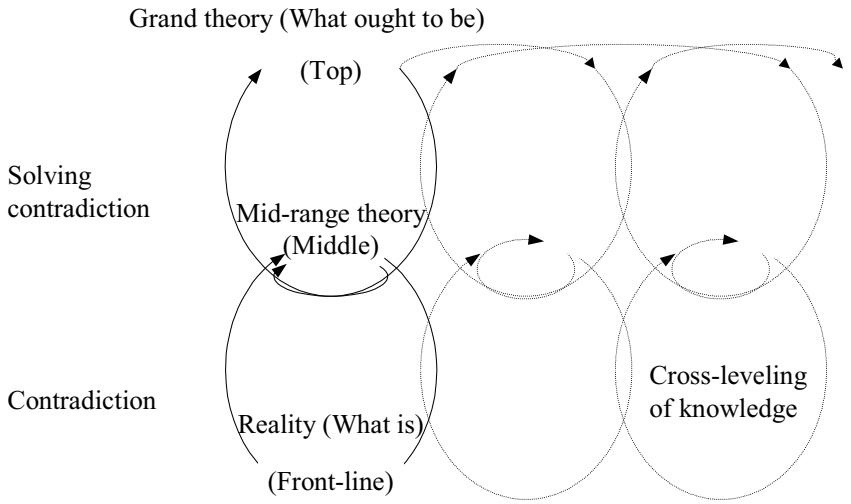

Figure 5.4 Middle-up-down management (Nonaka & Takeuchi 1995, p. 129)

As displayed in the figure 5.4, the middle managers role is like a bridge builder; the top management creates the grand theory, strategy and visions of the company, while the middle managers develop more concrete concepts and applications that front-line employees can understand and implement in practice[13]. Accordingly they try to solve the contradiction between the grand theory what the top management hopes to create and what actually exists in the practice in the front level (e.g. in Telecommunication Corporation in customer surface). Moreover, it could be said that their role is mediator-like or negotiator-like, but they also act as theory builders creating mid-range theory that they can test in practice.

[13] I need to point that the problematic issues and dichotomies between institutional theory and actual practice whether formal or informal should not be ignored, e.g. community of practice is seen as one proposal for answering the problems of knowledge management setting especially from the point of view of informal learning and knowledge creation and maintenance in every day practices.

The three roles of the middle-up-down management form the knowledge creating crew, that is, the actors in the knowledge creation process. These players, whose dynamic interaction is the primus motor of creating new knowledge, are: 1) knowledge practitioners, 2) knowledge engineers, and 3) knowledge officers (ibid, 151). Nevertheless, I maintain that their framework still is fairly useful and relevant in my study. In the previous figure, the middle managers are equivalent to knowledge engineers, while front-line employees are equivalent to knowledge practitioners. Top managers who create the grand theory play as knowledge officers; the name implies that it is in their hands, what knowledge is strategically meaningful. However, strategically important knowledge emerges also in great extent from customer surface or from lead users. Therefore, the exploiting of front line workers experience and knowledge is highly important. Table 2 gives an outline about knowledge creation crew depicted by Nonaka & Takeuchi (1995).

Table 2 Knowledge Creation Crew (Nonaka & Takeuchi 1995)

Knowledge practitioners divide into:	
a) knowledge operators - generate rich tacit knowledge from experiences from the closest realities of the busines (experiantial knowledge); - accumulation of tacit knowledge through bodily experiences	Front-line employees, line managers. Nonaka & Takeuchi (1995, p.153) propose an example of members from product design team of a new car who go for an 'ethnographical' trip into a object country of the new product in order to gain deep cultural knowledge. (Though Nonaka & Takeuchi do not explicate this process at all merely mentioning this, leaving thus all the problematic questions of cultural interpretation and data gathering out.)
b)knowledge specialists - mobilize well-structured explicit knowledge in the form of quantifiable data (that is, objectified, codable) that can be stored in databases.	Design engineers, scientists, strategic planners, marketing interviewers conducting a survey from customer needs, etc.
Knowledge engineers	**Middle managers**
Lead the knowledge conversion process; facilitating knowledge spiral along epistemological dimension (from tacit to explicit knowledge, tacit to tacit, explicit to tacit, explicit to explicit); facilitating ontological dimension -moving created knowledge from individual to group level and from group level to inter-organizational level. Create new concepts.	The middle-up-down model outlines middle-managers position on how they serve as a bridge between the visionary ideals of top management and chaotic reality of front-line employees (ibid. p. 154). Nonaka & Takeuchi's give an example (ibid. p. 155) on home bakery product development team in which a member first learned herself, socialized (tacit to tacit) into baking customs gaining thus new knowledge which she further explicated to the

	product development group (tacit to explicit). Qualifications for such middle-managers Nonaka & Takeuchi (ibid. p. 157) propose following attributes: 1) capabilities of project coordination and management, 2) skilled to come up with new hypotheses in order to create new concepts, 3) ability to integrate various methodologies for knowledge creation, 4) sufficient communication skills to encourage dialogue among team members (to enable knowledge creation), 5) capable using metaphores to help others articulate and generate imagination, 6) ability to create trust among team members, 7) ability to forecast the future based on understand of the past.
Knowledge officers	Top managers
Management of total organizational knowledge creation process; control and support of this process. Give sense of direction to firm's knowledge creation activities; creating company's visions, and grand concepts of what the company ought to be; creating knowledge vision. To know 'what ought to be'.	Example on senior manager from a product development team who managed the entire product development team by creating a vision for the process and providing efficient metaphores (ibid. p. 157).

I argue that their theory is merely one conceptual illustration of knowledge conversion and creation enabling way to organize managerial work and does have its limitations, such that it does not take into account knowledge that is embedded in social and material artifacts. Their middle-up-down model also leaves out some problematic questions of who determines and evaluates the value of information and from whose point of view it is meaningful or appreciated. Moreover, it is quite doubtful that hierarchy could simply stop existing (though implicitly middle-up-down management still maintains the classic hierarchy between bottom and top): Obviously the value of information still has dependency in relation to what is valued and considered important by the top managers.

6.0. Research questions

1.0. How is the supervisor's role developing in a high-tech company characterized with rapid technological and competence change in the grass root practices:

1.1. What kind of new tools,

1.2. ways to organize work and

1.3. to cooperate that represent second generation knowledge management, are emerging within the community of supervisors and managers?

1.4. What kind of new supervision role increasing competition and speed of change postulates?

2.0. What is the emerging new object and activity structure of supervisors' work?

I shall deal with the findings of my study in chapter 10 in which I interpret and conclude them, and draw them together keeping in mind my research questions. Since my study is hermeneutic, I have not written a research question & answer –sequences into my study, as is usually the case in typical quantitative studies. A list of answers would break the whole picture into isolated pieces of information while my interest is to capture whole and systemic delineation of the phenomenon under scrutiny. For this I provide rich description about the object of my study before getting into findings.

7.0 Presentation of the intervention method: competence laboratory.

The Competence Laboratory is a novel intervention method for developing work practices and competencies. It is designed and created in the Center for Activity Theory and Developing Work Research in the University of Helsinki. It is a further developed version of a similar intervention method called The

Change Laboratory (on Change laboratory see: Virkkunen, Engeström, Pihlaja, Helle, 1999). This method is intended and designed for second-generation knowledge management to capture knowledge embedded in work practices, communities of practices and innovation networks; and to enable new knowledge creation.

Ahonen et all (2000) describe the Change Laboratory as follows: "To realize the different learning actions the practitioners need special tools. The Change Laboratory is a room or space in the vicinity of the daily work in which there is a wide variety of instruments for analyzing disturbances and bottlenecks in the prevailing work practices and for constructing new models and tools for the work activity. The central tool in Change Laboratory is a 3x3 set of wallboards for representing the work activity, as well as video equipment. Additional tools needed to analyze the work include a reference library, databases and statistical data about the operation and performance." (Ahonen et. all 2000.) Those involved in a joint activity – as supervisors in my case – take temporarily distance from their daily work and engage in a related, but separate, learning activity in which the object is to develop and identify the developmental contradiction of their work practices.

Competence laboratory applies the ideas of Engeström's theory of learning activity and expansive learning (Engeström 1987, p., 131-137; see also Ahonen, Engeström et Virkkunen 2000). As Engeström (1987, 125) fairly radically stresses "learning activity is a mastery of expansion from actions to a new activity." As any activity, the learning activity proceeds through actions, which are intentional and have a goal (see Leontjev 1977, also Engeström 1987, 124-125). Such as: 1) questioning of the present work practices, 2) analysing the historical causes and present day manifestations of its problems, 3) developing a new model, 4) analysing the new model and proposed alternatives, 5) concretising the model and planning concrete implements and solutions to realize it. In other words the outcome of the learning activity is not just a new crystallization of ideas of the work practice

but a new form of activity, which is collective and systemic (see Ahonen et all 2000.) I will explain learning actions and cycle of expansive learning more in the chapter where I deal with the coding of my data.

The competence laboratory provides the physical and spatial space for the practitioner to take learning actions. Competence laboratory goes quite near to the concept of 'ba' (Nonaka & Konno 1998), though it is more specifically managed and arranged physical room than just a 'mental state' that 'ba' would be. It also provides practitioners special tools (3x3 set of wallpapers mentioned earlier) to realize different learning actions.

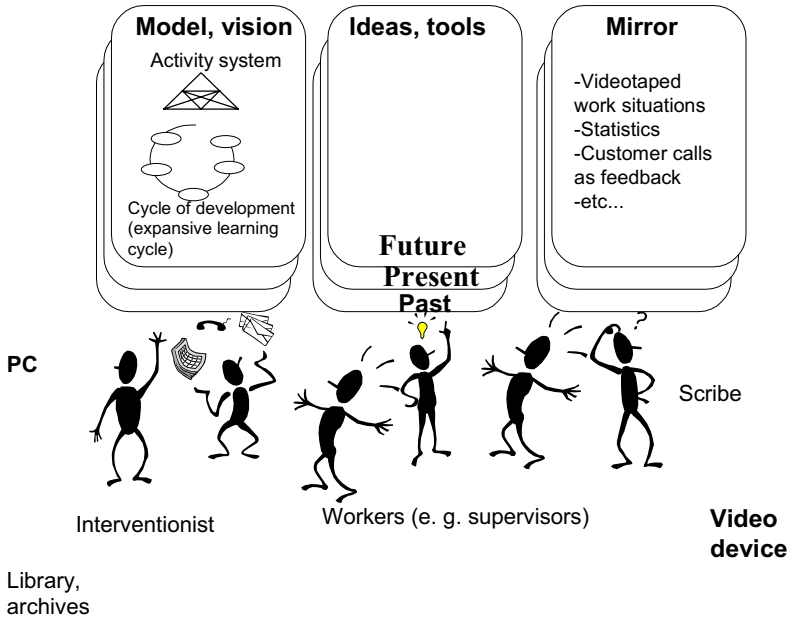

Figure 7.5 Prototypical layout of the competency laboratory room

Figure 7.5 visualizes the setting of the competency laboratory meeting. The mirror surface is used to bring actual real life cases and examples from work practices; the idea is to use them as springboards while analyzing, questioning, examining and modeling the work. The material used as a mirror to reflect the work practices can be customer feedback or feedback from the subordinates, as well video recorded work situations. It may even include a small ethnographic-like description about the work practices.

The ideas, tools –surface is reserved for ideas and solutions on work practices. It includes also intermediate tools such as schedules or organizational structure that are used to analyze some specific aspects of the work activity. Partial solutions are written on ideas & tools wallpapers. However, a systemic new model to organize work is outlined into vision and model –section.

As said, the model, vision –surface is used for modelling the work activity: the work is analysed and conceptualised with the help of structure of activity model (Engeström 1987) to model the different systemic, interconnected, dynamic and contradictory components of the work practice. Also, the model of expansive learning is used to conceptualise the historical development of the work practice, its current state and possible future direction. Both models are used also to construct a visionary new model of activity, the zone of proximal development (see e. g. Engeström 1987 p., 169-175) of the work activity.

The laboratory is designed for a natural work unit or team. Also an interventionist is present in the laboratory to direct and facilitate the discussions as well as modelling and conceptualising it. The meetings typically last two hours and are held once a week. While the change laboratory typically has five to ten meetings, the competence laboratory typically has six meetings and one follow up meeting, two months after the sixth meeting. The sixth competence laboratory meeting is run by the division chief, or by the chief of the competence laboratory participants. This is partly to get management and participants involved and take responsibility of the change ideas and change enterprises developed during the session. The development of the new work model is this way connected to the work and management practices so that efforts are made also after the sessions.

In my case study a group interview was held before the actual meetings. The function of the interview was mainly to play as an orientation for the facilitator. In the following pages I will describe more deeply how the competency laboratory intervention of developing the supervisors' work was conducted. Later I describe each meeting of my case and depict a matrix of each meeting using the components of the activity system to show concisely for the reader how each session represent supervisors' work activity and what kind of new elements come into the phenomenon of supervisors' emerging role while the intervention project continues.

8.0. Research site and data of my study

The rapid changes both in technology and products within the high tech and telecommunications industry have had its impact into how work and organization should be re-organized. These changes have also its impact on leadership and management practices in organizations. Telecommunication Corporation had already used the competence laboratory to develop the work practices in the corporation. However, it did not yet have been used it to develop specifically supervisors' work.

Since the previous competence laboratory interventions had been successful interventions in developing work practices in several divisions and organization units, the company decided to have such intervention project for the whole supervisor group of one unit. The developmental project took place in home customers and technical customer service division (TCS). It was conducted to all seven supervisors in the division, of which five supervisors have PC-card and telephone connection on-field installers as their subordinates, one is chief of technical support call center, and one supervisor is in charge of service agreements (maintenance, installing, repairing etc) of larger residences that have internal networks. The following figure 8.6 presents the inner structure of TCS division. It illustrates where I gathered my data:

My research site, technical customer service division

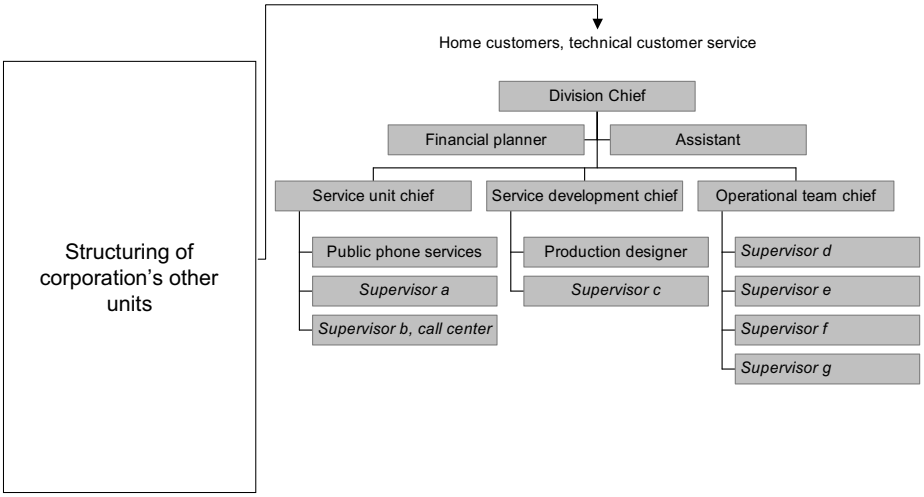

Figure 8.6 Structure of my research site

It should be noted that the previous figure 8.6 is just a rough outline; it is not meant to be a detailed organization structure of TC[14]. There are also several other business units that divide into smaller divisions, which are not shown in this figure. However, it clearly visualizes the inter-firm organization and inner structure of the TCS unit.

8.1. Data gathering

My data gathering started from the first meeting of the intervention project and continued until the very last meeting. The methods and tools for capturing this rich phenomenon were various. I videotaped all the competence laboratory sessions of the intervention project, and made a discussion log on each session. Those meetings that I did not videotape I wrote an observation memo, that is, field notes on conversation that took place. Table 4 shows all collected data, including a) primary analyzed data and b) secondary data that acted merely as an orientation and

[14] More detailed structure was left out to protect the identity of the organization.

ethnographical glance in to phenomenon. However, before listing all the data in my study I examine more the nature of it and my data collecting procedures.

The selection and analysis process was hermeneutic. At the beginning, I was merely observing intervention project that had an objective to develop supervisors' work in one division of a telecommunication company. As I listened and followed the project the deeper and deeper I went into this phenomenon until the major dynamics and nature of the phenomenon started to show up. As an ethnographer, the more time I spent in the field the more I had an understanding about what was going on in the supervisors' work developing project. Notwithstanding, I did not proceed strictly as ethnographer going into the deep variety and richness of the supervisors' work culture. My study is not an ethnographical 'thick description' (to use Geerz's notion) of the supervisors' work but a case study of supervisors emerging role in a telecommunication company from a specified theoretical framework's point of view.

As mentioned, I videotaped all the actual competence laboratory meetings and made simultaneously a conversation log file. I marked each argument with a synchronized time mark from the video camera's timer. The log file was rather precise and was almost like a transcription of each meeting. Later when I started to do the transcription on discussions in the sessions, I could already use of selection with this log file, making more detail transcription on those discussions that included conversation on supervisors' role. Since, I also was present at each meeting I had an immediate perception on each meeting's content. Chronologically my hermeneutic journey into this microcosm proceeded as follows:
Observation of all competence laboratory sessions while videotaping and writing a discussion log of these sessions, observing two direction group meetings and two division supervisors' meetings and writing a field memo of them.

1. Watching the videotaped competence laboratory sessions using the conversation log to analyze more in detail the episodes of conversations concerning supervisors' role.
2. Writing an analytical description of the intervention project on competence laboratory meetings using the concept of learning actions as an analytical tool.

My method is not a discourse analysis in the sense of making precise transcript that would capture all the rich verbal details of the phenomenon, but focuses on the argumentative content of discussions on supervisors' role. To provide reader the means to judge the validity of my analysis I have included several excerpts from the transcripts. Hopefully the excerpt and my 'tale' captures the nature of supervision work in this telecommunications company, since eventually through this it is possible to draw links into other similar companies and organizations struggling with similar challenges in supervision work, second generation knowledge management infrastructure, and competence strategies.

During the whole process, I had to make selections and decision on which data to focus. Later I decided to concentrate and analyze as case study like more in deep the seven competence laboratory meetings. My proceedings in selection on what data to analyses is rather similar as what Hammersley (1992, p. 184) asserts on case study: "It [selection] highlights particularly the choices that we have to make about how many cases to investigate and how these are to be selected." That could not be more right. My study process has definitely been about leaving something out and including other; already the limits of master's thesis circumscribe this. Nevertheless, I argue that research in general involves always a selective study of cases whether it is a case study or not, constant struggle between inclusion and exclusion is always at hand.

Nature of my data may be depicted also using van Maanen's (1979, p. 542) dichotomy of i) presentational data and ii) operational data. Dichotomy applies into field data and primarily into ethnographer's recordings of 'first-

order concepts' and 'second-order concepts'. First order concepts are the 'facts' of an ethnographic investigation, second-order concepts are researcher's interpretation on those 'facts' of everyday behavior and action (ibid. 540). Furthermore, second-order concepts are those notions and explanations used by the fieldworker to explain the patterning of the first-order data (ibid., 541). In my study, first order concepts are all observed talk, action and produced material of participants during the intervention project, that is, occurrences that took place during the meetings of the intervention process. Therefore, for the correct typing of first order concepts the presentational and operational nature of the data must be revealed, since otherwise researcher's second-order concepts -that is my interpretation and description on the phenomenon- might evolve rather thin or even false.

Van Maanen's division of first-order concepts and second-order concepts is same as what Scühtz (1967) comes up in his analysis of concept and theory formation in social sciences. He proposes: "The thought constructed by the social scientist, in order to grasp this social reality, have to be founded upon the thought objects constructed by the common-sense thinking of men, living their daily life within their social world. Thus, the constructs of the social sciences are, so to speak, *constructs of the second degree, that is, constructs of the constructs made by the actors on the social scene,* whose behavior the social scientist has to observe and to explain in accordance with the procedural rules of his science. (Schütz 1967, p. 59, italics me.)" That is truly what I have aimed to grasp in my study. However, my constructs on supervisors' constructs cannot always go into second-order constructs since the nature of my data is in large extent already second order constructs on supervisors' work. My data is not similar as research data that simply explains phenomenon under scrutiny, as traditional qualitative explanatory research methodology. Since my data is based on a developmental intervention research, also part of the data is intervention data. In my study the actors themselves analyze their work activity together with an interventionist who provides tools and concepts for the analysis.

Furthermore, I have not observed supervisors' behavior in their daily life in deep, only as an objective to acquaint myself with their work in the division. I also argue that I do not scrutinize supervisors' experience as the Schutz's previous rather phenomenological definition on social sciences purpose might imply; my focus is on the systemic nature of supervision work activity, not mere experience of its actions for the participants' or such[15].

Operational data, as van Maanen describes, "documents the running streams of spontaneous conversations and activities engaged in and observed by the ethnographer while in the field" (ibid. p. 542). Presentational data, however, "concern those appearances that informants strive to maintain in the eyes of the fieldworker, outsiders and strangers in general, work colleagues, close and intimate associates, and to varying degree themselves". As van Maanen (1979, p. 542, italics me) puts it, "*operational data* deals with *observed activity* (per se) and *presentational data* deals with appearances put forth by informants as these *activities are talked* about and otherwise symbolically projected *within the research setting*." My data consists of data from a intervention project and hence is not 'naturally occurring data' as such, but presents participants' current collective understanding and comprehension about their work that is modeled together with the interventionist during the developmental intervention research sessions. I have also included secondary data from the field. Besides, the intervention data itself has various layers. My study includes thus the following types of data:

a) Intervention data, which consists on all the intervention sessions in which participants use concepts and tools provided by the interventionist to analyze their work;

[15] Schutz's approach to social sciences is somewhat phenomenological-philosophical; mine is not in that sense, I do not aim to grasp that 'natural attitude' of supervision work in a telecommunication company. Furthermore, I argue that such 'natural attitude' is rather naïve construction in a research activity that is historically and socially constructed and the actor (researcher) is socialized into several implicit and explicit assumptions and theoretical guidelines of research. I maintain, that such phenomenological 'natural attitude' (first presented by Husserl) is itself a theoretical construction, invented in the corridors of academia; at least it is explicitly presented by philosophers socialized into academic doctrines before using the concept.

b) Modeling data, in which the developmental ideas and intervention project's objectives are collectively formulated more accurate or fit;
c) Operational data, which consists of my ethnographic field observations from supervisors' daily work as well as my field notes from the sessions. I have used this as secondary data to get a grip of the nature of my research object (I have used my session memos choosing conversations for transcription);
d) Presentational data, which consists of all the spontaneous discussions 'put forth by the participants' in the sessions, apart from deliberate intervention data.

The table 3 outlines more in detail the analyzed data in my study and table 4 outlines the secondary data, which I have not analyzed in deep but used to get a holistic idea about the phenomenon.

Table 3 Analyzed data.

Analysed data:	**Participants**	**Data:**	**Type of data: a)intervention data, b) modelling data, presentational, c)operational data, d)presentational data**	**Session Length**
1st competency laboratory meeting 11.2.2000.	Five supervisors (2 missing/on holiday), division chief (present only in the beginning) interventionist, myself.	Video recorded session, session memos made by participants,	a) intervention data	2 hours
		wallpapers, pictures, other production in session,	b) modelling data	
		my field notes,	c)operational data	
		spontaneous discussions in the session.	d)presentational data	
2nd competency laboratory meeting 18.2.2000.	Seven supervisors, interventionist, myself.	Video recorded session, session memos made by participants,	a) intervention data	2 hours
		wallpapers, pictures, other production in session,	b) modelling data	
		my field notes,	c)operational data	

		spontaneous discussions in the session.	d)presentational data	
3rd competency laboratory meeting 7.3.2000	Seven supervisors, interventionist, myself.	Video recorded session, session memos made by participants,	a) intervention data	2 hours
		wallpapers, pictures, other production in session,	b) modelling data	
		my field notes,	c)operational data	
		spontaneous discussions in the session.	d)presentational data	
4th competency laboratory meeting 14.3.2000	Seven supervisors + division chief, interventionist, myself.	Video recorded session, session memos made by participants,	a) intervention data	2 hours
		wallpapers, pictures, other production in session,	b) modelling data	
		my field notes,	c)operational data	
		spontaneous discussions in the session.	d)presentational data	
5th competency laboratory meeting 21.3.2000	Seven supervisors, interventionist, myself.	Video recorded session, session memos made by participants,	a) intervention data	2 hours
		wallpapers, pictures, other production in session,	b) modelling data	
		my field notes,	c)operational data	
		spontaneous discussions in the session.	d)presentational data	
6th competency laboratory meeting 28.3.2000	Seven supervisors + division chief and others from division administration, interventionist, myself.	Video recorded session, session memos made by participants,	a) intervention data	2 hours
		wallpapers, pictures, other production in session,	b) modelling data	
		my field notes,	c)operational data	
		spontaneous discussions in the session.	d)presentational data	

Table 4 Secondary data.

Secondary data:	Participants	Data:	Type of data: a)intervention data, b) modelling data, presentational, c)operational data, d)presentational data	Session's or meeting's length
Group interview 1.2.2000.	All seven supervisors, interventionist, myself.	Video recorded, My field notes.	d) presentational data c) operational data	1 ½ hours
Division's monthly executive meeting 3.2.2000.	All supervisors of the division (strategic + operational), division chief, myself, interventionist of the competency laboratory	My field notes.	c) Operational data	3 hours
Competency laboratory planning/management meeting 9.2.2000.	Division chief, interventionist, myself, 2 participating supervisors.	My field notes.	c) Operational data	45 min.
Competence laboratory planning/management meeting 6.3.2000.	Division chief, 3 supervisors (2 of them attendants of the laboratory), interventionist, myself	My field notes.	c) Operational data	(app) 45 min.
Division's monthly executive meeting on division's strategy. 24.5.2000	All the supervisors and executives of the division, interventionist, myself.	Video recorded meeting. My field notes	d) Presentational data c) Operational data	3 hours
Superivisor running meeting with subordinates; telling strategy below, 26.5.2000.	Call center supervisor and 7 of her subordinates, division chief, myself.	Video recorded	c) Operational data	2 hours
7th competence laboratory follow-up session[16]	All seven supervisors, plus one new supervisor division chief, tech chief, product chief, myself, interventionist.	My field notes Notes from video recorded session.	c) Operational data d) Presentational data	2 hours

[16] This data from the 7th follow-up session was used to question respondent validity collectively with the informants (see more in chapter 10).

The intervention project itself and all the data produced in it is a projection of participants' - supervisors - daily work. Moreover, nature of meetings in the intervention project is that they are (this characterizes competence laboratory generally) collective discussions proceeding analytically and critically through cycle of expansive learning (this is explained elsewhere in this paper). False appearances and statements about supervisors' daily work would have exhibited during the meetings (except if all participants' would have played a collective hoax which is not the situation). Hence, the data contains an element of error correction that increases reliability when it comes to its correspondence to 'real world' supervision work.

8.2 Unit of analysis and analytical proceedings

The unit of analysis is supervisors emerging new role, that is, actor within activity system. For analytical instrument of the intervention project I have constructed a schemata based on learning actions (Engeström 1987; Engeström 1999, p. 384; Ahonen, Engeström, Virkkunen 2000; Leontjev 1977). In the description chapter of my empiric data I shall first describe the entire intervention process. Later, I shall present my analytical reconstruction of the intervention process based on significant learning actions that took place during the process. I construct and summarize this using the analytical model or schemata that I later exhibit. Therefore, specifically the categorical unit of analysis from the data has been learning actions that occurred in the intervention project. My coding - transformation of description into analysis - proceeds somewhat simultaneously with the description of the intervention process. Also Mishler (1984, p. 35) asserts that the boundaries between description, analysis and interpretation are blurred. Actually, the whole decsription part in my study includes both analysis (coding with the learning actions schemata) and description.

Against all odds, I did not start to work my way through my video recorded data as major qualitative research method guidebooks would have proposed me to do. I did not start to do any conversation analytical study, say; about

institutional talk and how institutional realities are evoked (see e.g. Heritage 1997, p. 168) for example in supervisor-subordinate interactions, how tempting it might have been. Moreover, I did not dive into any discourse analytical, meta-theoretical, constructionism (see e.g. Potter 1997, p. 146), say, supervisor-subordinate power relations, or into trendy Foucault power-knowledge jargon on, say, hierarchical relations and surveillance methods in supervision work. I have focused more into the discursive learning action sequences of the intervention between the interventionist and the practitioners as well as between practitioners, mediated through the tasks and materials provided by the interventionist, oppositely as in discourse analytical tradition in which the data could be analyzed using question-answer sequences (e.g. Silverman 1993, p. 124). All those methodological and analytical proceedings would -by no means- have been relevant, but they would have not -I believe- captured the supervisor's emerging new work activity and role as such dynamic and object oriented systemic whole, which is case now in my study's activity theoretical and applied developing work research approach.

8.3 Learning action as an analytical tool

Such as any activity proceeds through goal oriented actions (see Leontjev 1977) also learning activity proceeds through learning actions (Engeström 1987, Engeström 1999, p. 384 also Ahonen, Engeström & Virkkunen 2000). Those actions are: "1) questioning of the present work practices, 2) analysing the historical causes and present day manifestations of its problems, 3) developing a new model, 4) analysing the new model and proposed alternatives, 5) concretising the model and planning concrete implements and solutions to realize it." (Ahonen, Engeström, Virkkunen 2000.) Also sixth and seven learning action emerge in the follow-up phase of the intervention process. These five learning actions characterize competence laboratory and small-scale cycles that occur there (see further). However, the following ideal-typical cycle of expansive learning (Engeström 1999, p. 385) shows how actions built a whole methodological and analytical activity, comprising total

seven learning actions. The figure 8.7 is relevant here since it outlines how I have proceeded analyzing my data using the cycle of expansive learning as a guideline. I point that the four first learning actions have been the code units in my analysis.

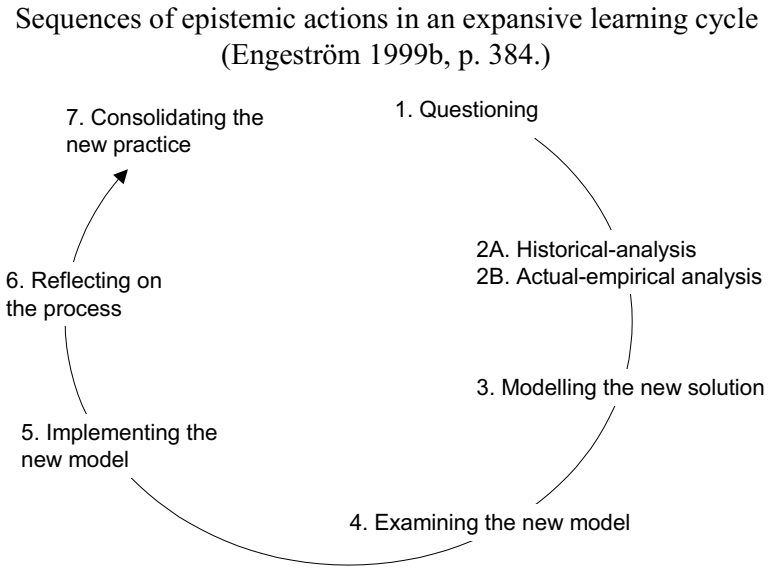

Figure 8.7 Epistemic learning actions in an expansive learning cycle

The following figure 8.8 presents large-scale cycle of expansive development. The epistemic learning actions in the previous figure are those epistemic actions that trigger these large-scale expansive cycles as described later.

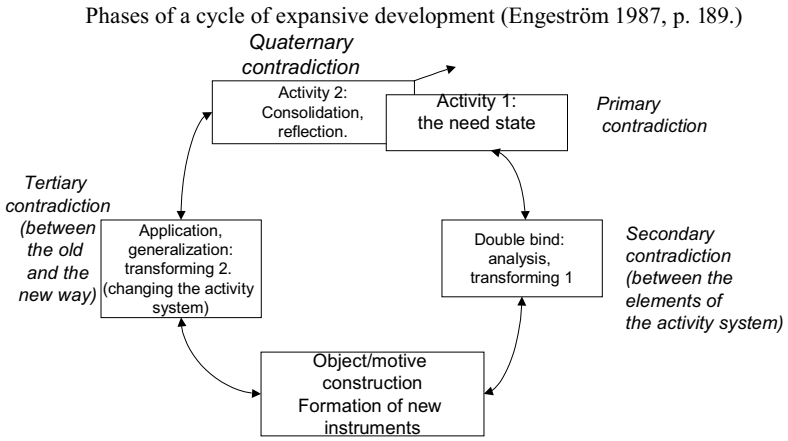

Figure 8.8 Cycle of expansive development

Engeström (1999, p. 383-384) describes seven ideal typical sequences of epistemic actions in an expansive cycle as the figure 8.7 illustrates. However, the five actions (described earlier) refer better to more miniature cycles of expansive learning that take place during the intervention process meetings. Moreover, competence laboratory is more based on miniature cycles and the intervention process aims developing a new activity model, which is then after the sixth meeting implemented and later reflected in the seventh follow-up meeting, the sixth and seventh learning actions emerge therefore not until there. Smaller innovations may be implemented already before the whole six meetings have been taking place, since the facilitator deliberately directs the discussion in small-scale innovative expansive learning cycles in mind. In conclusion, the learning actions are sequentially embedded into the data, thus making this category a somewhat 'logical' or 'natural' coding proceeding.

After all the objective of the competence laboratory methodology is to produce a 'large-scale' new work model (see presentation of competence laboratory methodology). In fact, the structure of six meeting and one follow-

up meeting constitutes a large-scale expansive cycle (figure 8.8 illustrates this) of organizational transformation or transformation of new activity model. As Engeström (1999b, p. 385) points, "the occurrence of a full-fledged expansive cycle is not common, and it typically requires concentrated effort and deliberate interventions." Obviously, this is what the competence laboratory aims for. All the meetings constitute smaller cycles of innovative learning. The learning actions in a cycle of expansive learning do not necessarily occur in linear way. The two-headed arrows of a cycle of expansive development signify the iterative, nonlinear character of the process. Also Engeström (ibid, p. 358) notes that "a large-scale expansive cycle of organizational transformation always consist of small cycles of innovative learning." Conclusively, I claim that competence laboratory is a clear manifestation of such.

8.3.1 Conclusion on primary data and coding

The primary data analyzed are all six intervention project sessions of this very intervention case. I use the secondary data for orientation into division's work in general, and as a background for my interpretation. Consequently, this means that my study consists on data from two contexts: Other, the data from intervention project, and other from field observation. These two contexts of data also increase the validity of my data and analysis, as data triangulation would anticipate (e. g. Silverman 1993).

Mishler (1984, p. 36) defines coding as "methodic procedure for classifying events and behaviors." My coding that hence proceeds through learning actions attempts to prepare and classify the events and data from the competence laboratory for further analysis. After description I propose an analytical summary of the intervention project and supervisors' emerging role in it, based on coding of these learning actions. Mishler maintains that (ibid), "such as transcripts are transformations of observations, coded data are transformations of descriptions". My description hence includes both

these transformations, though reader can easily 'see' the description and coding elements in the following chapter; they are not a chaotic mixture. I have endeavoured to write out my procedures as explicit as possible to enable the reader also judge the validity of my analysis and later the reliability of my interpretation. During the reading of my description and notes on learning actions I ask the reader to refer figures on page 36 that illustrate the sequences of the learning actions.

9.0 Supervisors redefining their role by taking learning actions

In this chapter, I describe developmental competence laboratory intervention sessions that lead to redefinition of supervisors' systemic role. Role of the interventionist in the development project was to deliberately provoke supervisors' to take collective learning actions to create new knowledge and conceptually redefine their role and what parts of it should be developed. In this chapter, I focus firstly to describe and illustrate how the picture of supervisors' activity system (=role) gradually transformed and re-conceptualized throughout the sessions. Secondly, I will outline what kinds of learning actions supervisors took and what was their content.

9.0.1 1st direction group meeting: introducing the method to division's management

Before the actual competence laboratory meetings started, the interventionist arranged a specific project's direction board meeting. The function of this meeting was firstly, to give a brief idea on the methodology and objectives of the intervention method. Secondly, listen the participants and division management if they had specific wishes about the methodology and topics that should be examined.

The participants in the first direction meeting consisted on division chief and two supervisors who were to participate in the actual laboratory meetings. The interventionist introduced briefly the methodology and basic ideas of the competence laboratory. She also gave copies of two first meeting agendas. After this some comments and discussion about work in the division was made. Especially the division chief stressed as good point that there would be no supervisor-subordinate relationships in the meetings and thus no hierarchy problems during the laboratory sessions.

9.1 1st session: introducing the method & analyzing current leadership activity

The first laboratory meeting started with interventionist's introduction. She explained to the attendants the nature of the competence laboratory and the basic guidelines of the methodology and the function of the wallpapers. Role of interventionist as a facilitator and mediator and my role as a non-participant observer were made clear. Interventionist stressed that the idea is to make a prototype about the supervisors work, a systemic model of their work activity. She also pointed out that the supervisors' work and the new model are examined from the grass root perspective: at the end they themselves produce the new model, it does not come as a ready-made concept from up, or outside their daily work.

After the introduction the division chief gave an opening speech on leadership in the division. He used balanced scorecard as an agenda and went through the values of the company. He stressed that the most critical factor in the daily leadership activity is customer relationships:

"Stress the customer relationships and value of customers (to your subordinates) every day, since customer service is one thing our competitors cannot take away from us."

He outlined that the learning of the subordinates is half customer relationship management and half mastering technical skills; all this includes also the leadership know-how. He also underlined that all seven teams of the supervisors' ought to form a solid chain, and that they should be able to help other teams when needed. "In the beginning of the nineties each team had separate objectives. (…) A shift from team-centeredness towards division-centeredness is needed", he states. He concluded that during following 12 months they (supervisors) ought to shift their thinking to think that "can I help 'neighbor' team for the success of the whole?"

After his speech the division chief left the laboratory room. The participants discussed about the changes in leadership and management in the supervisors' work during the coming year until February 2001. The interventionist divided supervisors into two groups and asked them to draw a chronological line about their work, a hypothetical zone of proximal development. Here interventionist deliberately provokes a 2B learning action, an actual-empirical analysis of supervisors' daily work and future prospects.

The following figures 9.9 (next figure) & 9.10 (latter figure) are replicates of participant's drawings into wallpapers. These figures are not just figures as such but also obvious products of a 2B learning actions:

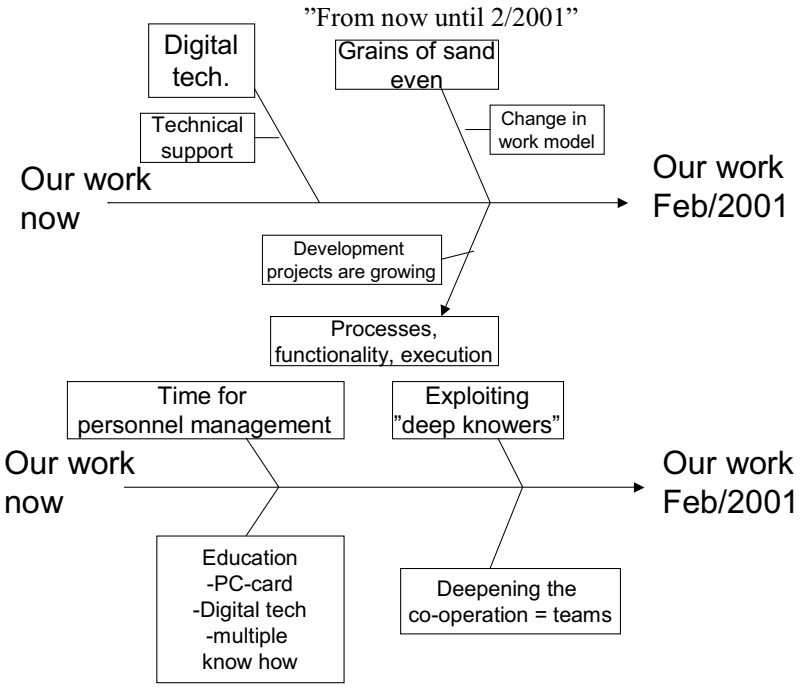

Figure 9.9 Wallpaper from the 1st session

The drawing (figure 9.9) summarizes the discussion made in two small groups. As the figure shows, the other team used a word "coach" describing their future work model: "We should be coaches," was said, implying that it was a question of a sort of need or want state. The others also said that change in their leadership model was about to happen within a year.

After the discussion of the future of supervisors' work, focus was shifted towards the current work practices. That is, interventionist started again a new learning action provoking the discussion towards actual-empirical analysis. In the orientation group interview session, supervisors were asked to fill up a work diary, in which they were supposed to write down positive and negative incidents in their daily work. This diary was intended to provoke the participants to take learning actions of questioning and analyzing. Later this material was used as a mirror and springboard in the session to arise discussion about the work while analyzing the current situation (2B learning action again). Here a product of first learning action, the diary homework, and learning action 2B joined: actual-empirical analysis was made based on a product of first learning action, questioning. The discussion about the objects of supervisors' daily work was summarized into wallpaper using an analytic scheme provided by the interventionist. Figure 9.10 below presents this wallpaper:

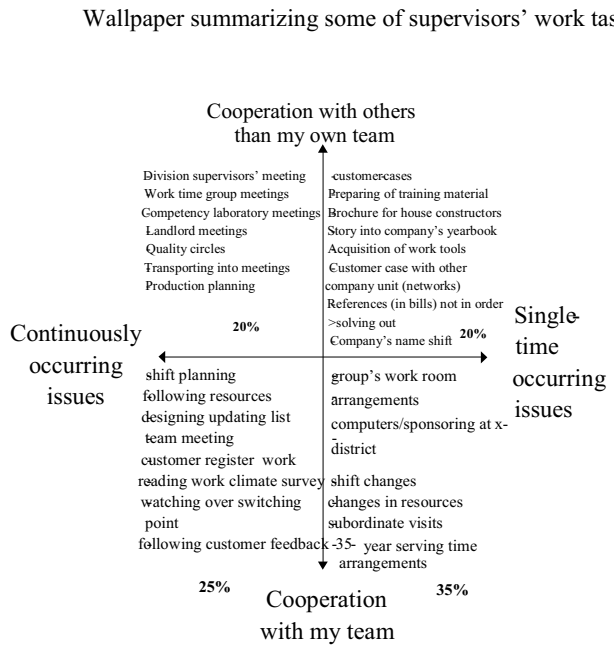

Figure 9. 10 Supervisors' tasks, wallpaper from the 1st session

The modeling figure 9.10 is again a product of second learning action (2B). It delineates those daily tasks that supervisors did during a workweek. The

percentages are rough suggestions (that were written into wallpaper also) about how the time was divided on each segment. However, it shows that most of the time was used to solve one-time occurring tasks with one's own team. Although the figure is bound to the context of the discussion and not quite clear to an outsider it shows that already the first competency laboratory meeting showed how rich and complex the object of supervisors' work activity seemed to be.

Summarizing, the first meeting was divided into three themes, and consisted mostly on questioning (learning action 1) and actual-empirical analysis (2B). Firstly, general information about competence laboratory as a method was discussed. At this point, the interventionist played central role. Secondly, sight was turned into supervisors work future; in which the division chief made introductory speech, and later the supervisors discussed in small groups about into what their work ought to evolve towards within a year. Interventionist asked them to draw their discussion as a chronological line, as showed previously. Thirdly, end of the meeting was used analyzing the current work practices and daily work; analysis was made using work diaries, which the supervisors had been doing during a week. This part included also a discussion on bottleneck situations that had occurred during a week: supervisors mentioned problems in customer cases, resource management, team-mail, and in shift planning.

The next figure 9.11 of general activity structure summarizes components of supervisors work activity in the way it was discussed and occurred in the first meeting. It gives a general overview on how some components of the activity and major inner contradictions (double bind contradictions between some components of the activity system) in the activity were reflected in the discussions at this point of the intervention process. The matrix (table 5) gives more in detail description about the content of each component.

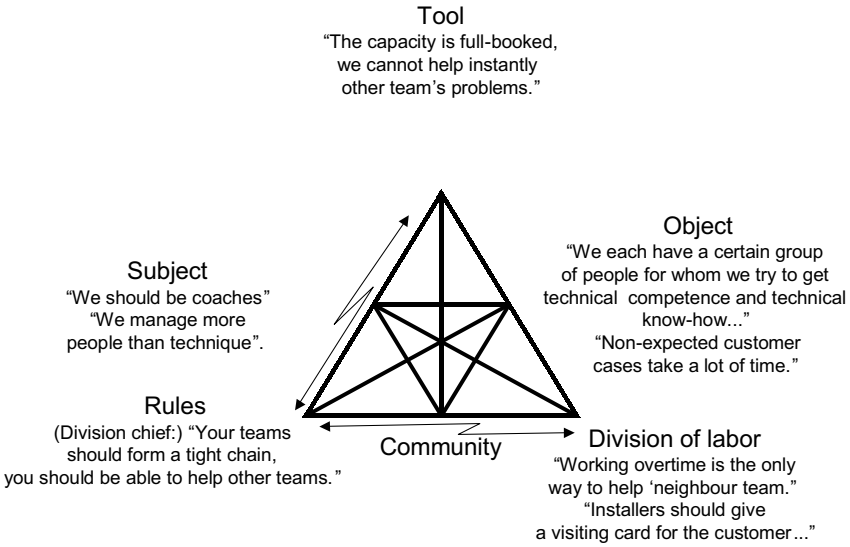

Figure 9.11 Structure of activity, 1st session

Table 5 More in detail description of 1st session's activity structure components

Subject	**Tools**	**Object**
(Supervisor1:) "We should be coaches" (Supervisor2:) "We manage more people than technique".	(supervisor:) "Team-mail has both increased and decreased work." Shift planning Resource planning (Supervisor:) "The capacity is full-booked, we cannot help instantly other team's problems." Quality circles.	Supervisor: "We each have a certain group of people for whom we try to get technical competence and technical know-how. We just have to secure that these processes work." (Supervisor:) "Non-expected customer cases take a lot of time."
Rules	**Community**	**Division of labor**
(Division chief:) "Your teams should form a tight chain, you should be able to help other teams."		(Supervisor:) "Working overtime is the only way to help 'neighbor' team." (Supervisors:) "Installers should give a visiting card for the customer, and they should say to the customer that if the installation doesn't work then call me. Now the customers keep calling us and we cannot deal with the problems instantly"

9.1.1 2nd direction group session: discussing on contents of the meetings

At this meeting, there was one supervisor of the participating supervisors'. Each supervisor was selected to participate into direction group meeting at a time since it was considered more representative and various opinions would be gained that way. Also the division chief was present this time and another chief from the division's management level. The second project direction meeting included discussion about the supervision and management culture and division's work in general.

Interventionist made clear that the process had been proceeding without any problems. Supervisors also mentioned that they were involved into the development process and that the dialog had been open:

Supervisor: *"To my opinion everything has been said. Nobody's been beaten. Surely we supervisors must go into same direction; it would show if supervisors wouldn't work collectively. Our most important work is towards installers and customers."*

Furthermore, discussion on supervisors and their subordinates took place. As one supervisor put it:

"Personal contact (seeing installers) on the field is still important, that personal contact should not be forgotten. (...) At their (subordinates) level that doubt (about what supervisors actually do since they are rather invisible to the field) is bigger; we just see them in meetings but they don't know much of (our supervisor's daily work) practices."

Supervisors also said that they are highly aware of their critical position between the visions of strategic executives and grass root customer contacts. The next figure 9.12, based on my field notes during that meeting, illustrates my interpretation of the supervisors' position at this point in the process (hence it is a second-order concept, a researcher's interpretation):

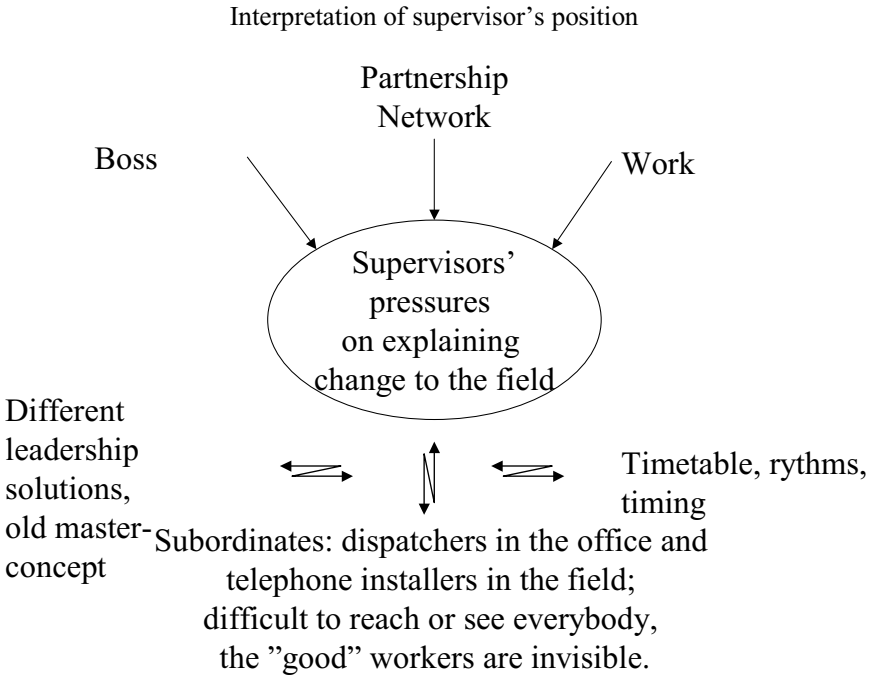

Figure 9.12 Supervisor in the middle

9.2 2nd session: Division's history, from past till present

The second meeting was divided into two major themes. Firstly, a historical analysis and examination into past couple of years of division's teams was made. Here the historical analysis, 2A learning action, was rather explicit. Interventionist used also structure of activity (Engeström 1987) to model the present work. Consequently, here some bits from third learning action started to emerge, though the inquiry was still limited into general level. More specific object-historical analysis and model of leadership work activity was not yet done, the interest and unit of analysis was thus about the division as a whole. Nevertheless, the structure of activity was modeled into wallpaper, thus making it under collective scrutiny, observation and analysis.

The following table is adopted from wallpaper that was written during this meeting, I have added some quotes about the discussion that occurred while

the historical incidents were written on wallpaper. This wallpaper is also a product and outcome of historical analysis, a 2A learning action. It shows the major historical changes in the technical support and customer service division's work. Especially year 1993 is highly relevant for the supervision activity, the change in telecommunications law has had several and multiple impacts both into how telecommunication markets have been rapidly expanding. This has had impact also into organization inside structure and dynamics, since changes in markets, telecommunication legistlation and new product innovations effect supervision work due to systemic nature of work activity. For example when the rule producing activity, that is, legistlation changes, it creates tertiary contradictions[17] between the old activity and given new activity; for instance a new motive in telecommunication legistlation may well be somewhat contradictory as work practices in telecommunication company based on older legistlation. Table 6 illustrates major occurrences in division's history.

[17] Tertiary contradiction refers to inner contradictions of human activity (see Engeström 1987, p. 82-91). Tertiary contradiction refers here into contradictions between the old general supervisor work activity and new more developed rule-producing activity of the telecommunication legistlation bureau. I will explain the contradictions (primary, secondary, tertiary and quarternary) more in detail elsewhere in interpretation section of my study.

Table 6 Division's history

Year	Major incidents
1990	(supervisor:) "New division chief came from outside, [the budget was launched to supervisors'] first time around 1990."
1992	(supervisor:) "Multiple competency cells came around –92, the supervisor organization was changed towards cell and team organization, and the teams were spread around the district (company's business area)."
1993	Change in telecommunication law; meant free competition within the industry, when the state diminished its role. Division is organized into several teams. (supervisor:) "E had even his own office at the (…) district."
1994	Internal networks. Adaptation. (supervisor:) "We became sellers around 93 and 94."
1995	Result salaries Technical helpers.
1996	Some developmental projects in the unit. The technical customer service telephone desk comes up with a major change: (supervisor in charge of the help desk:) "Our work used to be mere receiving of reclamations, now it expanded from mere receiving into guiding and helping of customers. We sure had a change in our customer service."
1997	New organization, the division is divided into four teams, which meant increasing in the amount of people per team. Second adaptation. New division chief The PC -card installations start to increase. The *new values of the company* are presented: This meant especially tremendous impact on increased customer service. (Supervisor1:) "Selling spirit is essential. One cannot take staying in the job for granted anymore…" (Supervisor2:) "We needed a change in attitudes, away from institution-like thinking towards customer driven attitude."
1998	The PC-card group is divided into teams.
1999	New personnel are recruited for the first time.
2000	New products and technological solutions are presented, such as broadband modem connections.

In this session, the historical chart was centered into the division's history. However, historical change and transition in division's outside world has had lot of input into work of the division as well. I should point out that this division is clearly a part of a larger organization, a system within a system. This means that (outer) environmental forces in transforming the history and development of work have been great. These environmental change factors have been getting more stronger during the past few years: especially reorganization of the corporation structure and stock listing has had strong impacts into the division and how work and supervision should be done there to fulfill the challenges that the new era has brought. These changes and challenges inside the organization and Telecommunication Corporation,

however, all are part and a follow-up of a bigger environmental, or system's outside, forces:

1) freer markets within the telecommunication industry due to new legislations and state's role (globally and nationally),
2) rapidly evolving products and techniques and faster product cycle times, and
3) increasing competition, and finally,
4) increasing speed of change is all previous elements.

I will examine these quite essential factors more in deep later, though one can already see here similarities with the six change factors of Nadler & Shaw (1995) I presented earlier.

The following table 7 and structure of activity (figure 9.13) show similarly as in the previous chapter the different components and tensions of supervisors work activity in the discussions of the second meeting.

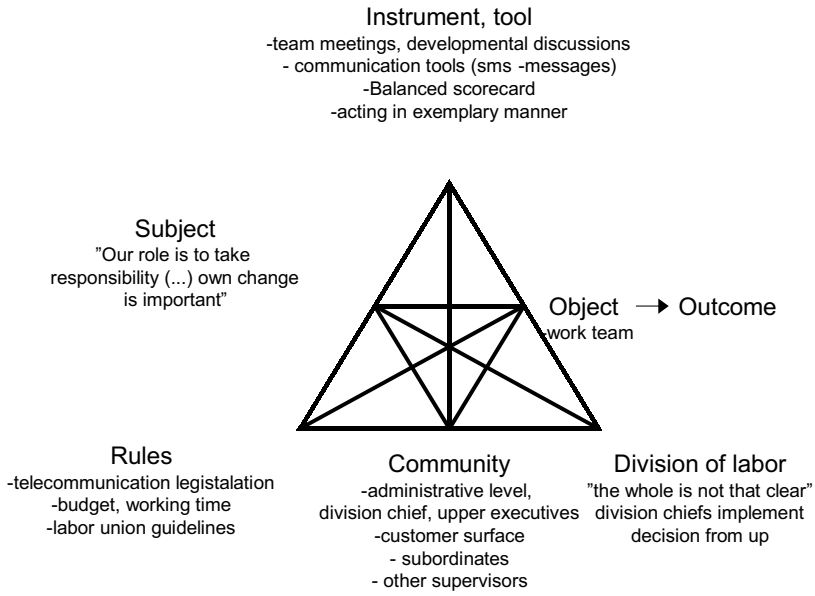

Figure 9.13 Activity structure presenting the 2nd session

Table 7 More in detail description of 2nd session's activity structure components.

Subject	**Tools**	**Object**
-Division supervisor (supervisor:) "Our role [in change management] is to take responsibility, that is, see the customers behind all the issues, own change is important."	-Team meeting (Supervisor:) "In team meetings we must bring just those issues [that their subordinates must continuously update their competence] forward, so that they don't fall of the tracks since we need to be still working after three or four years and keep as many posts as possible." -Personal discussions -Developmental discussions: (supervisor-subordinate) (Supervisor 2:) "Developmental discussion is one of those occasions where we decide these things [that is, place were some of the strategic decision and plans are transmitted to subordinates]." -Leadership solutions -BSC -Using own behavior as an example how subordinates should do also. -Communication tools (such as SMS-text messages)	-Work team.
Rules	**Community**	**Division of labor**
-Working time -Telecommunication legislation -Labor union guidelines -Budget,	(Supervisor:) "Well and then there is that we deal with the administrative level of our division and a bit upper executives, so we see how they think. Then we deal with customers, and see how they think. Then we also deal with many subordinates and see how differently even they think –making use of this knowledge and then applying it our own activity and taking into account all this viewpoints." -Division chief -Product chief -Other supervisors (-customers: -at this point, the customers were not mention as a central part of the community) -Product producers -Competitors -Telecommunication state officials	(Supervisor:) "The spread-out type of work is a problem, the whole is not that clear." -Division chief and product chief decide, supervisors propose and implement. -Outside cooperation network creates opportunities for development.

9.3 3rd session: analyzing supervisors' cooperation network

The third meeting, dealt with two broad issues. Firstly, supervisors' inter-organizational and intra-organizational cooperation networks and subordinates feedback on leadership were analyzed and discussed together. In terms of learning action, actual-empirical analysis 2B was made. As the various components in activity structure, especially division of labor and community were scrutinized. Secondly, the current and late leadership models and leadership types were discussed, and some ideas of how to improve the current model were presented. Hence here three kind of learning actions emerged and mixed in the session, 1) questioning, 2) actual empirical analysis and 3) some modeling of a new solution, although the developing and modeling of a new model was deliberately left more on later meetings; this meeting was merely to function as a springboard and orientation deeper into the rich phenomenon.

Between second and third meeting, the supervisors were asked to interview their inter-divisional cooperation partners. The interventionist also conducted subordinate interviews; these tasks produced lot of material into the mirror surface and were used to question, and critically analyze the current and historical leadership activity, here 2 A and 2 B learning actions combined

Following figure 9.14 of general activity structure again gives a brief overview into the components of the supervisors' activity during 3rd meeting. The matrix (table 8) gives more in detail description of each component.

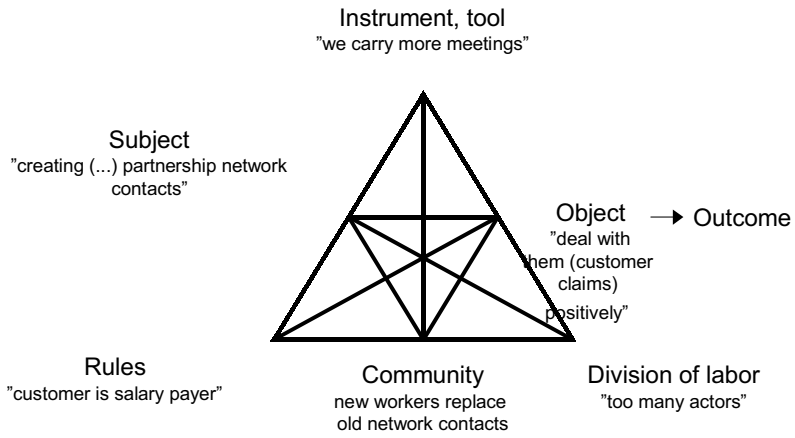

Figure 9.14 General structure of activity of the 3rd session

Table 8 More in detail description of 3rd session's activity structure components

Subject	Tools	Object
(Supervisor:) "...nowadays the supervisor deals with creating possibilities, such as partnership network contacts, making it so that the contacts run fluently in all levels."	*(Supervisor1:) "It is actually so that we carry out more meetings than before and obligate subordinates."* *(supervisor2:) "Before (years ago) we had a one meeting per year, last year there were over 20."* *Interventionist: "What tools in supervision work you have in relation to strategic management?"* *(supervisor2:) "It is the PC (computer) that is important tool, and then team-mail and information searching."*	*(Supervisor:) "Before we gave technical explanations to customer reclamations or we ignored them; now we deal with them positively and try to correct them instantly."*

Rules	Community	Division of labor
(Supervisor:) "Customer is now the salary payer." (supervisor:) "Customer must be served and treated instantly."	*(Supervisor:) "We have a good example how these PC-card installations functioned with [other] division: we got all the codes and passwords from there. But when the new digital technology came there was a new fellow at the [other][18] division dealing with these issues: we ran out of passwords (...) So our work became much more difficult from what it used to be; there was just a new fellow [in the other division of cooperation network]."*	*(Supervisor:) "The problem is that there are too many actors, the organizing of a many-threaded cooperation is the difficulty."*

9.3.1 Supervisors' cooperation network emerges in the third session

Cooperation network and leadership work now and in the past were discussed and analyzed using wallpapers; the interventionist summarized the discussion into a matrix. The matrix had two time dimensions about supervisors' leadership model, leadership tools and (intra-corporate) partnership network. The partnership network or community was divided into four actors, that is, subordinates, corporate partners, strategic managers, and customers. The following paragraphs summarize the content of wallpapers and discussion that occurred during analysis of on supervisor's cooperation network and partners. Following pages consist therefore on actual-empirical analysis (learning action 2B) of community and division of labor. Products and outcomes of this learning action is a wallpaper and discussion on activity structure's community component. Since the wallpaper was just a list I have not enclosed it here.

[18] Text written into [] parentheses indicates a word that I have replaced to to hide either identity of the company or another delicate matter. I point that they are not my interpretations of informants' speech but as correspondent synonyms as possible. When I have used () parentheses it indicates that the sentence has been unclear and needs clarification about its content.

Supervisors & subordinates

In the past, supervisors were more like a master towards their subordinates, and the leadership style was more authoritarian, strict, and formal. The subordinates' work was more routine-like and their role was merely the "taking care of orders"; they also had narrower competencies. The supervisors used guidelines, orders, control, listening, and authority as their leadership styles and tools. To sum up, they were authoritarian leaders who mastered all the competencies needed in the installation work.

The present supervisor is seen more as a "motivator", "change manager", "making decisions with the whole team and "salesman of capacity." Their subordinates have broader competencies than before; they are seen as responsible and autonomic self-developers (self leaders). Supervisors' leadership tools are team meetings, production-planning meetings, developmental discussions, cellular phone SMS-messages, computer, and capacity reserving. They also mentioned cooperation with other supervisors as one of their leadership conventions.

The following quote shows that supervisors and subordinates relationship in terms of division of labor and rules has changed tremendously and the roles are not that clear anymore. Especially their subordinates mentioned in the feedback that the interventionist gathered, that the role of dispatcher and supervisor is somewhat blurred.

Supervisors & corporation partnership network

In the past, the cooperation over division borders, boundary crossings, was based on personal contacts (fellows) in other intra-corporation divisions. Major cooperation tools used were telephone and other papers and documents. At present, the cooperation over division borders has changed;

partly because of new personnel that are not familiar with the old unofficial network and partly because some divisions inside the corporation have been changed since an organization's restructuring. However, one of the tools of cooperation are still based on those personal contacts, that is, unofficial organization, though the corporation structure and subsidiaries has changed the old customs. Following quote is an excerpt from actual-empirical analysis (learning action 2B) in which tools, division of labor and community are examined:

Supervisor: "It (cooperation with inter-divisional partners) used to be more personal."
Interventionist: "Well what is it now?"
Supervisor: "Nowadays we still now most of the people, but there has come this [system] (corporation's intra-organizational charging guidelines). If we do something to somebody (else outside division) it costs: the other asks instantly that with what cost number do we bill you?"

Other cooperation tools (tool and division of labor in activity system) - beside personal contact network and fellows - between supervisors and intra-corporate network are telephone and guidelines for charging intra-organizational cross-divisional tasks. While in the past the supervisor were responsible for the intra-organizational cooperation, now they play more as mediators and contact brokers; supervisors are not anymore masters in technical competencies and individual's competencies within the organization are moreover more secularized, therefore they play more as bridge-builders, brokers and mediators between the participants:

Interventionist: "So you're kind of like brokers, that you know the network and act like mediators and say that 'you deal with these'?"
Supervisor: "Yep, for example. Cause it's no use for us to be - if it's a technical matter - there as middle-hand."

The previous quote defines the subject's position as actual-empirical analysis reveals within community and division of labor. This may be the case for instance in customer reclamation: Customer first contacts supervisor who then, afterwards contacts installer to solve the claim in joint activity without supervisor's interference. However, this is an ideal state and most of the installer's do not yet obtain sufficient competence to deal the customer as a whole.

Supervisors and division's top-management and labor union

Before the labor union and top-management were somewhat stronger, especially in the decision making process the labor union had more impact in the past. The former division chief and leadership culture was more informal, and lot of strategic information was shared during coffee breaks with the division chief. The strategic managers planned year budgets, and production numbers were brought down as ready-made. The supervisors characterized that the past time was "an era of stillness", as one supervisor put it. Following quote is from a discussion of interventionist's provoked analysis of supervisors' relation to top-management. It is a manifestation of historical analysis on rules and community:

(supervisor1:) "...workers weren't necessarily listened or talked with, but at the background there strong labor union, really strong/[19]"
(supervisor2:) "/that crushed when it wanted. Labor union did all those solving decisions."
(supervisor1:) "Yeah otherwise nothing happened."

Nowadays the interactions with division management are more formal, making formality hence actually a model or mode of cooperation. The division has a monthly supervisors meeting were the strategic management shares strategic information and budget numbers with supervisors. I observed two these meetings, which therefore provided me operational data on those spontaneous conversations occurring in supervisors' daily work. However, I do not analyze the interaction in those meetings more in detail, since they act mere as ethnographical orientation and data triangulation for me. I will describe this monthly division supervisors and executive meeting elsewhere at that point when it was discussed in a session. The following quote about the increasing meetings entails that to run meetings is emerging into more essential tool in supervision work:

(supervisor1:) "Meetings have tripled." (...)

[19] / -indicates that other informant interrupts a sentence.

(supervisor2:) "During the past years we had one meeting per year, last year we had 20!"

Supervisors & customers

When it comes to supervisors and customer relations the transition from master and authoritarian supervisors' role into more democratic and somewhat humble role can be seen. In the past supervisors were as masters and authorities towards customers. They did not take into account customer reclamations or gave mere technical explanation into them. As was mentioned in the meeting, the customers were "under mercy of the company."

The new corporate values put the customer in the center, and require the supervisors to think and act in a customer-centered manner. Customers are considered as "kings" and "those in charge of salary"; all reclamations and bottlenecks in customer side are to solve as soon and discretely as possible. This is quite obvious since after all the object of the division business activity is customer (at least it is getting more central all the time). Therefore, an excellent customer service plays at the end a crucial role in division's business: in praxis, in strategic planning, and in strategic management.

9.4 4th session: modeling supervisors present leadership phase and relation to top-management

The fourth session focused on analyzing and modeling of division's leadership activity, while the previous meetings had been in level that was more general. Division chief was present in the fourth meeting. His task was partly to outline the visions and strategies that would affect the division's leadership and supervision. The division chief gave a speech on supervisors' role in strategy and in company's values. Supervisors were asked to critically

question their chief's vision. Conclusively, this meeting modeled the historical developmental phase of supervisors' leadership activity and its relation to strategic management. 2A learning action on supervisors' leadership activity was made consisting both on a) object-historical analysis and b) theory-historical analysis, though focusing more into theory-historical analysis.

The following figure 9.15 is adopted from wallpaper that was collectively produced in the fourth session. Since, the discussion at this point was more of a listing items, I do not enclose more quotes here. The figure outlines the major changes and occurrences in division's leadership model depicted in this session. It is also a product of 2A learning action, historical analysis of supervision work in this organization unit.

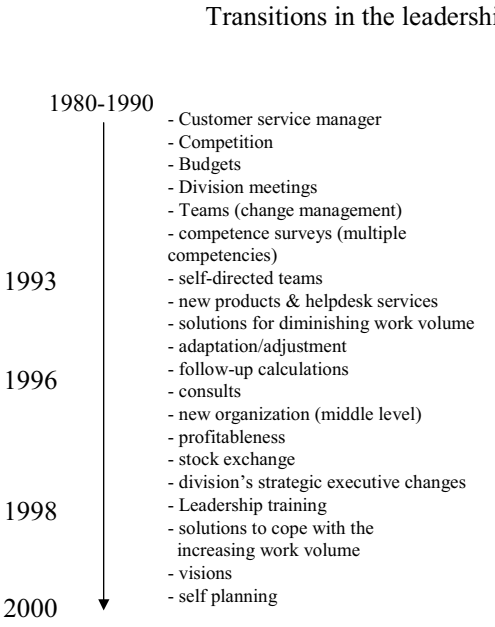

Figure 9.15 Historical changes in leadership

During the fourth meeting, the supervisors' cooperation towards their managers was one of the major topics, as mentioned. The division chief was present at the meeting firstly to give his own vision on leadership and

supervisors' work in the division and secondly to listen what the participants thought of them. One of the major challenges that came up after division chief's speech on which all agreed upon and was then written on wallpaper, was how to influence subordinates attitudes. Also, another major tool to influence them is by running meetings and talking with them. However, there is a contradiction between this tool and division of labor that emerges with explanations of 'there is no time'. It is a double bind, a secondary contradiction between new tools and old division of labor (as also mentioned in the matrix above): especially a continuous life long learning and increasing importance of customer relations means that subordinates need to socialize new attitudes what the discontinuous change entails. Following quote is from this division chief's speech that well itemizes the situation in competence change:

"...every supervisor must take care of competencies. If we now talk about that under our, yours, supervision work people's competency consists on two things; customer know how, that is customer service, the true essence of mastering customer relations. And secondly it consists of this really strong technical know how that needs to be constantly updated, and develop it both horizontally as vertically; this (on-field installers' technical competency) is what customer doesn't necessarily question, s/he takes it for granted."

The monthly division meeting was also analyzed and development ideas were written on wallpaper. The supervisors are rather quiet in these monthly meetings and they said that it feels as if the decisions were brought from upstairs as ready-made. Also the function of the meeting was questioned, that should it be discussion or decision-making meeting. Moreover, presentations that are more concrete were asked for and more "noise" in the meetings was merely considered as an asset. Furthermore, size of the meeting was seen also problematic:

Supervisor1: "The problem is this big crowd."
Supervisor2: "Normally if it is a meeting decisions are made, these are just this kind of information stuff."
Supervisor3: "Yep, those information things can be delivered everybody on paper, I can read."

General structure of activity (figure 9.16) outlines again dynamics of this session. Table 9 provides more detailed transcription on each component.

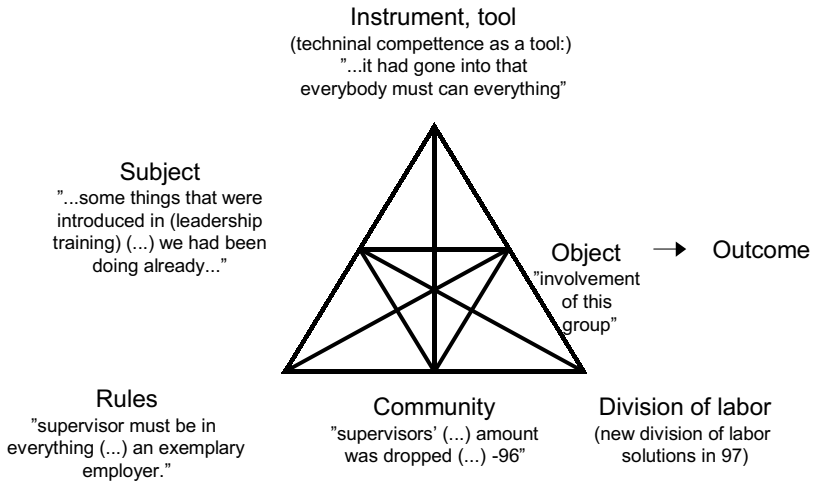

Figure 9.16 General activity structure of 4th session

Table 9 More in detail description of 4th session's activity structure components

Subject	**Tools**	**Object**
(Supervisor:) "It is just that some things that were introduced in [Top Leader] (Leadership training course in year -98, see the previous figure). We had been doing already for several years: developmental discussions and this team leadership, that it was this kind of coaching; we talked about this transition into a coach model already when these teams (see the figure) were started, though it took quite a while."	*(Supervisor:) "About still that multiple competency (supervisor refers to previous discussion): what happened and changed from earlier times was that now (he points to the wallpapers figure around year -96 and new organization) everybody were considered to be as 'multi- knowledgeable'. Originally that was not the plan, originally the idea was that somebody was a cross checker and somebody a caretaker, but now it had gone into that everybody must can everything."*	*(Interventionist:) "So what are those supervisors' real tasks from development's point of view; important tasks for future? Doing priorities yes, but what else?"* *(Supervisor:) "It is involvement of this group. How to get them to understand this whole; this really has challenges. And importance of customer relationships will become more and more central in the future; customer service in the future, that is the key question."*
Rules	**Community**	**Division of labor**
(Division chief:) "Supervisors duties in order of importance would be; setting objectives and trusting people, but constantly follow actualization of this objective. And with courage to interfere in real causes of set backs, not superficial causes but actual causes. (...) Other is to communicate and influence, since leadership is to a large extent about influencing. (...) Supervisor must be in everything - that is visible, smells, is observable - an exemplary employer."	*(Supervisor:) "Most hardest was consults' feedback session (see figure 1996), when they slammed new organization structure in table. There we then just held our breath and thought that what does it mean; since was it that we were at that time nine supervisors, but the amount was dropped down to four on this basic teams. That was year -96."*	*(Supervisor:) "At this point (around 97, refers to the figure) came this that "J" took this basic team and I had these new and "S's" team and these economic tasks came to me. So here came this kind of mid-step, division chief."*

9.5 5th session: coming up with change ideas

At the end of the fourth meeting, the interventionist gave a task for the supervisor to produce change ideas of how to develop their work activity. The

objectives of these change enterprises on supervisors' activity needed to have following qualifications: 1) to supervise in a more profitable and gainful manner so that it produces better customer satisfaction, 2) to supervise in a more rational manner, 3) to supervise and manage by the strategies of the business, 4) to learn more efficiently together. Thus, it was up to supervisors to produce the material for the fifth meeting and come up with the change ideas from their frame of reference. Later in the meeting, all their ideas were written on wallpapers under collective scrutiny, into the idea -surface.

The interventionist had also prepared a model of the developmental phase picture of the supervisors' work. She had modeled the historical type of supervision activity and the current supervisors work activity into two activity structures. This model was critically evaluated during the meeting; interventionist asked whether she had modeled the work activity correctly. She also asked how the supervisors would name their own work model (see next chapter).

The change ideas were all written on wallpapers. First all ideas were listed into several papers. As a whole eleven change objectives emerged. After that these eleven ideas were categorized into a table consisting of horizontal and vertical axis on the basis of whether they effect on team or network supervision or merely into one's own team supervision (vertical axis). Other dimension in horizontal axis consisted of ideas that had to do on outcome objectives and at the other end on development and learning objectives. The following figure 9.17 is a reproduction of wallpaper. It illustrates the model interventionist introduced to categorize the change and development ideas and into which the ideas were marked. The numbers indicate the change ideas.

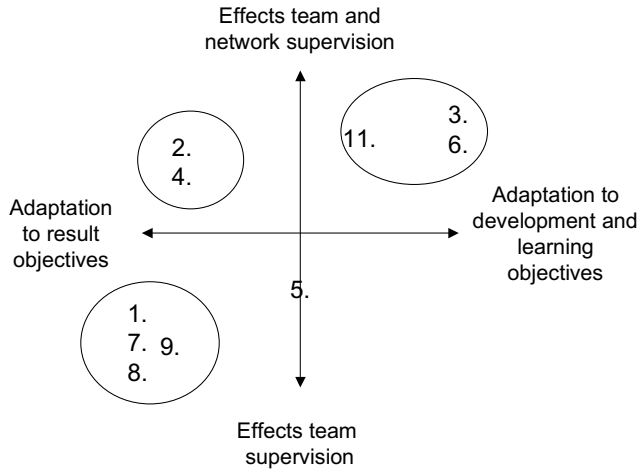

Figure 9.17 Categorizing the change ideas (replicate of a wallpaper)

Wallpaper was used to make the development ideas under collective analysis. Following table 10 outlines the content of the proposed ideas.

Table 10 Proposed change ideas (replicate of a wallpaper

1. Field personnel involved behind decisions.
2. Centered competence center, user technician.
3. Taking part into strategic decision-making
4. Common meeting for teams.
5. Taking direction toward human resource manager
6. hints from outside, training=half day courses
7. Team's small group meeting.
8. Taking part into work.
9. Delegating, Giving more authority (decision-making power).
10. Longer service time
11. Handling a claim in error correction process.

The table 10 outlining all proposed change ideas is also a clearly exemplary a manifestation of modeling knowledge, being a product of third learning action, modeling a new solution.

9.5.1 Three development enterprises

At the end, three enterprises were selected among the eleven proposals:

1) delegating,
2) planning of meetings in the division,
3) Supervisors' own training/competency and benchmarking. (vai listataanko kaikki kehitysideat tässä vai liitteeseen?)

The delegating was motivated by stating that it would increase productivity, customer satisfaction, and make the work more pleasant. The second idea, planning of meetings, was motivated to enhance time use, cut out the overlapping meetings and find out who are responsible for informing in each meeting. Supervisors' own training was chosen in order to find a solution for gaining new know-how especially on digital technology.

Especially one rather radical and expansive idea about central competence center was presented during the meeting, though it wasn't further developed later on. It is a clear manifestation of a small-scale innovative learning cycle. Obviously all these new innovations do not end up into the new model, if they lack the systemic nature or do not take into account other components in the activity system. The central competence center -idea outlines rather well the problem of supervisors' work and timing of it; on the other hand they must manage their team, act as personnel managers and see and talk to their subordinates, but on the other hand they have to cope with all those 'dull daily tasks'.

Following figure 9.18 of activity structure gives again a brief overview about the 5th session. It is followed by more detailed matrix (table 11) about the components of the activity.

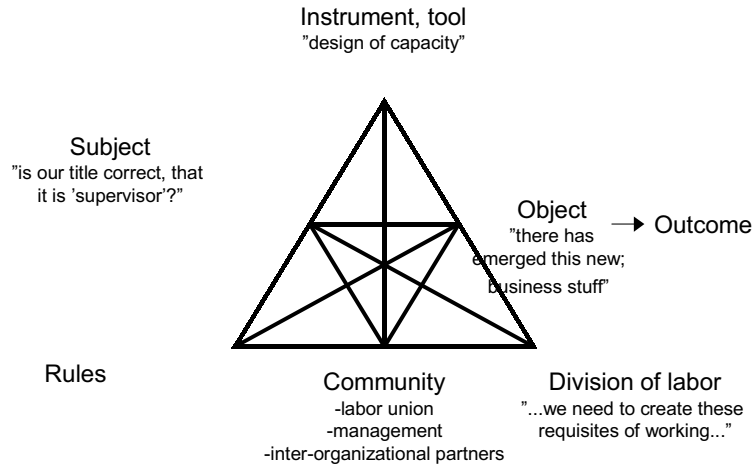

Figure 9.18 General structure of activity of the 5th session

Table 11 More in detail description of 5th session's activity structure components

Subject	**Tools**	**Object**
(supervisor:) "One thing that has occurred with me with customers is that we are called supervisors; and a customer called me and wanted to complain about something, but didn't want to talk to me but with my 'chief'. That then we talked with the previous chief also is our title correct, that it is 'supervisor': it feels that even the customer would want to have somebody with a better and higher title to talk with."	*(supervisor:) "One that has really clearly been here now is that design of capacity, it is not up there (supervisor refers here a wallpaper in the competence laboratory room which models activity of 80's supervision work – now supervisors themselves design their capacity). It belongs here it is very important."*	*(supervisor:) "Yeah, those old things still exists, but beside these there has emerged these new; business stuff, and telling those to teams and running teams,"*
Rules	**Community**	**Division of labor**
	-labor union *-management* *-inter-organizational partners*	*(supervisor:) "First of all we need to create these requisites of working so that it doesn't happen that you end up being a backup-man. It has this certain danger, that if you are there (on the field, considered among subordinates) like a over capacity caretaker or backup man, so you don't do your own stuff anymore but your important task becomes that being a backup."*

The main objectives of the fifth meeting were to produce concrete ideas and development trajectories. Hence, it was a clear manifestation of combination of 3rd and fourth learning action, modeling the new solution and examining this new model. These three ideas that were selected out of eleven were to be further developed between fifth and the last meeting; participants selected three teams whose task was to prepare and develop further these three selected change proposals during the week.

9.6 6th Session: deciding on change trajectory and new model

Discussions in the sixth session were based on the three change ideas that were selected in the previous meeting. These were further developed and new change management trajectory was designed. Moreover, a vision on supervisors' work was outlined. Hence this session was about examining and developing the new model, the session consisted mainly on fourth learning action combined with modeling the new solution.

One of competence laboratory's methodological ideas is that division's chief (or participant's manager etc) runs the sixth meeting This is partly because it gives a more concrete idea to the management level what subordinates have been doing in the laboratory outlining their picture on the strategic issues. Also, it provides valuable information for the participants about strategic management's intentions and wishes.

Interventionist was present at the sixth meeting but she only intervened if the discussions went on sidetracks. Since the interventionist didn't take actively part into the facilitating of the discussion as in other meetings, she was able to model supervisors vision model during the actual meeting and discussions on change enterprises. The vision model was written on wallpaper and at the second half of the meeting it was collectively evaluated and discussed. Thus examining, analysis and evaluation of the new model was done collectively and critically.

Another part of the new model, division's meeting planning, that was selected in the fifth meeting as mentioned in the previous chapter was named as a 'meeting map'. This metaphor crystallized the function of this tool; it would show who are on which meetings and what are the topics and interest of each meeting. Moreover, it would have a similar orientation

function like a real map. Meeting map exhibits a component of the new model, a construction of new collective tool.

The general structure of activity, figure 9.19, outlines conversations and learning actions taken in this session. Table 12 gives excerpts on each component of the activity discussed in this session.

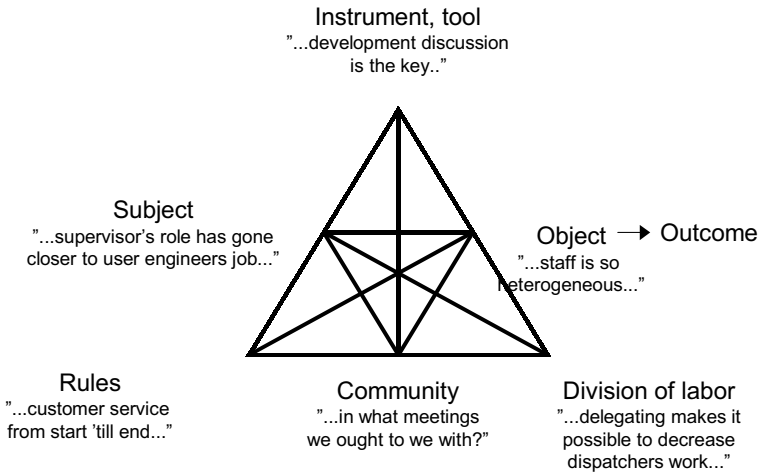

Figure 9.19 Activity structure presenting the 6th session

Table 12 More in detail components of the 6th session activity structure

Subject	**Tools**	**Object**
(supervisor:) "That supervisor's role has gone closer to user engineers job; staff starts to do their job on their own, supervisor is not anymore needed: he sits here at the office and fills those tickets that the user engineer used to design as for next seasons objectives."	*(supervisor1:) "The developmental discussion is the key. From there comes the competency level and where we start from."* *(supervisor2:) "I would like that things would go to correct meetings, and there would be right persons to decide upon them. And also that the responsibility to inform others would be clear; those who sit there we would know that they also have to inform on decisions."* *(supervisor2:) "But now we have gone into a situation already that most of our subordinates are technically much more advanced than you or me."*	*(supervisor:) "...our staff is so heterogeneous: others [need more help] and others are significantly more autonomous and do whatever. Supervision model either cannot be that straightforward."*
Rules	**Community**	**Division of labor**
(division chief:) "All the installers do everything. People are not same, even customers are not the same. I would say it is a good direction that person carries responsibility and takes that customer service from start 'till end."	*(supervisor:) "Now then that there has been those two supervisors who are on side (who do not participate in some meetings), so think about when you are in those meetings, that in what meetings we ought to be with."*	*(supervisor:) "This delegating makes it possible to decrease dispatchers work. (...) [If] they could see that one task as a whole thus it would become more efficient and improve also customer satisfaction and maybe this broader aspect would also cheer fellows themselves."*

Briefly, this sixth meeting was about the new model construction, analyzing and planning concrete solutions and tools to implement the new model. It was hence a manifestation of 4th learning action, though already also some dialogue on implementing the new model took place.

9.7 Summary of the meetings

In this chapter, I propose my analytical summary based on my coding using learning actions. In other words, it is more like a reconstruction of the intervention process: analytical summary of the intervention process. Based on coding and description of the intervention process I elaborate an overview of the intervention process from the point of view of emerging new supervisor role, a new activity system.

The following table 13 includes excerpts and quotations from learning actions that depict the emerging new supervisor role in second-generation knowledge management during the development sessions. The interventionist provokes all the learning actions. The learning actions outline how supervisor role became questioned and re-conceptualized during the developmental sessions.

Table 13 Summary of learning actions taken in the sessions

Learning action in expansive learning cycle:	**Objective of the learning action**	**In what meeting the learning action occurred ?**	**Content, topic**	**Quotes from the learning action:**
1.1. Questioning	Analysis of supervisors' work object based on their work diary.	1st meeting	Listing of all tasks and duties what supervisors did during a workweek.	"Non-expected customer cases take a lot of time."
1.2. questioning	Questioning present work: supervisors were asked to draw a line about what their work would be in a year.	1st meeting.	Supervisors' role in a year from their point of view.	"We should be coaches." "Grains of sand even." "Exploiting deep specialists (qualified subordinates)."
1.3. questioning	Questioning object of the present work based on supervisors' work diary.	1st meeting	Listing of all tasks and duties what supervisors did during a workweek.	During this learning action object was in focal point, see figure on p. 42 (product of learning action).

2A.1 Historical analysis	Historical analysis of leadership activity in the division.	4th meeting	Analysis of supervisors' leadership historical development.	(Interventionist:) *"So what are those supervisors' real tasks (…)?"* *(Supervisor:) "It is obligating of this group. How to get them to understand this whole (…) …And importance of customer relationships will become more and more central in the future; customer service in the future, that is the key question."*
2A.2 Historical analysis.	Analysis of division history and its present day manifestation in supervisor role.	2nd meeting	Historical analysis of division's work history. Excerpt illustrates how historical role manifests in present practice.	Interventionist: *"How would you now outline your own role? There before you told, that you didn't do much of any decisions but what is your own role in this change (organization & leadership change)?"* Supervisor3*: "Changing course of our subordinates."* Supervisor3: *"Well and then there is that we deal with the administrative level of our division and also with upper executives a bit, so we see how they think. Then we deal with customers, and see how they think. Then we also deal with many subordinates and see how differently even they think – making use of this knowledge and then applying it in our own activity and taking into account all this viewpoints."* Supervisor6: *"And still we don't know all things so well we should do."*
2B.1 Actual empirical analysis	Analysis of supervisors' co-operation network (3rd meetings' main topic).	3rd meeting	Analysis of supervisors' co-operation network.	Supervisor1: *"I'd say that during this change what has been going now in the 90's from this traditional supervision role into this present model; so it is that we have all the time (…) moved, this decision making downwards. (…) routine tasks have moved for dispatchers to do. And I think it has succeeded quite well, and one doesn't have to in every detail. (…) As an example (…) a decision about a free day to somebody; they don't have to come to ask from me, since I have to ask anyway from the dispatcher about what's the situation (in capacities and queues etc.): S/he can give that one free day (straightaway), or tell that one can have it!"*

2B.2 Actual empirical analysis	Analysis and questioning of supervisors` present model.	5th meeting	Interventionist questions whether the present model is coach model	supervisor: *"...because of that we based those small groups; there is coach and ten people, and we thought that in that one can easily implement this beginning of change. And yes it went quite well. But then just time changed it and we noticed that it's not economical and we had to enlarge groups. The beginning was this kind of ideal thinking, that it would evolve this kind of coach organization; it's somewhere there, it's not the past but it's not the coach organization either."*
2B.3 Actual empirical analysis.	Questioning supervisors' work/model object. However, this learning action already contains a bit of modelling a new solution.	5th meeting	Interventionist deliberately questions the object of supervisors present activity, that it is more towards customers	Interventionist: *"...what this objective is?"* Supervisor1: *"...There is one thing that has occurred to me with customers once, that our title is supervisor. (...) is our title correct, that it's supervisor: it feels that this customer would like to have somebody with a higher or better title. (...) we'd have like some title that would give a better picture to customer..."*
3.1 Modeling the new solution	During this learning action that started form interventionist's analysis of present model also modelling of a new solution emerged.	5th meeting	Analysis of present model and modeling new solution; how to manage people instead of technique	Supervisor5: *"This kind of model must be vanished from it. That kind of responsibility must be given that if one has a broken tool so he goes to repository and gets one; he has it there with personal name, and we get the bill and see it then. These kind of driving reports and stuff, we can put them into some place. This is something we must get off here and now settle these things out, so we really spare time to think how do we go forward with people."*
3.2 Modelling the new solution	Conceptualising new model; trying to model the new solution and new supervisor role.	5th meeting	Naming the potential new supervision model.	Interventionist: *"So your objectives was this kind of coach-model? (...) what is this real model now if it's not the coach model? How would you name this new one?"* Supervisor3: *"Creator of possibilities, enabler."* Supervisor4: *"Being everywhere."* (...) Supervisor1: *"If that group would be smaller, like it was originally ten people and the area would be smaller, then it would be damn good; everybody would meet every morning."*

4.1 Examining the new model.	Supervisor presents his idea about the new model.	5th meeting	Examining a new model, and components within it.	Supervisor1: *"That we supervisors wouldn't have to get into these problem situations more. That there would be centralized place where would be these problem solvers. (...) those technical things would be solved there."*
4.2 Examining the new model.	Supervisor analyses a change idea and into what it would be needed for. (See p. 48)	5th meeting	Examining a potential new tool in the new model, a common team meeting.	Supervisor1: *"Well let's say when we think of these team so they typically have a team leader. In our place, it's rather miserable, we've not succeeded in organizing such a team: in a factory one can organize such a team but which always has a team leader. (...) The group would choose one and he would be like once or twice in a month (...) This kind of a small meeting where they bring their issues and really there would be no other topics than those brought beforehand."*
4.3 Examining the new model.	Again, supervisor examines the work and how dialogue is essential tool in managing people.	5th meeting	Discussion on change enterprises and examining the potential new model and components within it.	Supervisor2: *"It's lot of talking, that you're dealing with people. (...) through that you really get people involved. But we don't have time to that. (...) have a developmental discussion there instantly. (...)and to tell to this person in whom you've got good feedback (...) one would learn. (...) That's one subject in personnel management."*
4.4 Examining the new model.	Interventionist questions what is the supervisor role developing towards.	6th meeting	Examining the new model, and subject within it.	Supervisor1: *"That role of supervisor has become more closer to user engineer's job, he sits here at the office (...) it seems that it's going more and more into that direction."*
5.1 Implementing the new model				
6. Reflecting on the process.				
7. Consolidating the new practice.				

One can see from this table that supervisors' role became questioned throughout the sessions but any they could not come up into any single role concept or defined new model during the analysis and learning actions taken throughout the sessions. Especially the present work practice is questioned several times, and different contradictions in the activity are named, for

example the coach model was adequate before and fulfilled the need at that historical point when it was implemented but has now evolved inadequate.

10.0 Findings

In this chapter, I provide richer picture how the emerging new supervisor role became questioned in the sessions, and what kind of typologies and descriptions supervisors gave to their work activity. I have enclosed several discussion excerpts from my transcription throughout the sessions in to Appendix A. Excerpts are also products of learning actions. They show more in detail content of the conversations and learning actions in the competence laboratory sessions. The following table gives a summary of different explicit and implicit role typologies that supervisors gave to their work activity during the provoked conversations.

I have taken all quotes in the table from several discussions throughout the sessions in which supervisors tried to name their role, or their role was discussed, either explicitly using a clear role typology or implicitly by describing their work. The former role names are hence taken from informants' speech; I have given names for the latter. The table 14 shows more in detail whether supervisors have themselves used an explicit role metaphor or whether they have tried to name their role only descriptively.

Table 14 Supervisors' various roles, discussed in Competence Laboratory sessions.

Competence laboratory session:	**Types of role mentioned in the sessions:**	**Nature of concept: a) implicit descriptive, b) explicit metaphore.**
1. session	**"Coach":** "We should be coaches"	b)
2. session	**Change leader**: *"..making of that change." "Changing course of our subordinates."*	a)
	Emerging broker (see Wenger 1998): *"..we deal with the administrative level (...)and upper executives (...) we deal with customers (...) also with many subordinates –making use of this knowledge and then applying it in our own activity and taking into account all this viewpoints."*	a)

	Implicit broker/networker: *"Well and then there is that we deal with the administrative level of our division and also with upper executives a bit, so we see how they think. Then we deal with customers, and see how they think. Then we also deal with many subordinates and see how differently even they think –making use of this knowledge and then applying it in our own activity and taking into account all this viewpoints."*	a)
3. session	**Coach:** *"It is actually so, that we hold more meetings and obligate staff." Interventionist: "It has changed into running more meetings?" "Yeah, and more like a coach-like work."*	a) + b)
	Emerging broker: *"Delegating downwards, responsibility is given downwards in all levels."*	a)
	Enabler/broker: *"...nowadays the supervisor deals with creating possibilities, such as partnership network contacts, making it so that the contacts run fluently in all levels..."*	a)
	User engineer: *"...when we don't need to always deal with those small things, since our job is that background work anyway."*	a)
	Explicit broker: *"(interventionist:) So you're kind of like brokers (...) you know the network and act like mediators (...)?" (supervisor:) "Yep, for example. Cause it's no use for us to be - if it's a technical matter - there as middle-hand."*	b)
	Implicit broker: *"Delegating happened more upwards, and these positions were sort of like hierarchical, much more clearer then: engineers just did their job and supervisors did their. Delegating was even upwards; those decisions were not necessarily made though organization"*	a)
4. session	**Competence coach:** (division chief:) "...every supervisor must take care of competencies."	a)
	Coach: *"...some things that were introduced in [Leadership training] (...) We had been doing already for several years: developmental discussions and this team leadership, that it was this kind of coaching."*	b)
5. session	**Coach:** *"It was meant to be anyway, that supervisor became this kind of a coach. I don't totally agree that it has become such, cause now it has become more these kinds of supervision tasks that it was then."*	b)
	Competence coach: *"(...) you need to like more manage those people and adjust that supervision model into, that you can manage these people (...) give responsibility to them still more, so that they do that job. And take care that they have that competency and know-how and that you make it possible, that they have resources. You really manage people, not work."*	a)
	"Being everywhere."	b)
	"Creator of possibilities, enabler."	b)
	"All-around-man."	b)
	"Service chief (...)."	b)
	Human resource manager: *"It's really an objective that we would become real human resource managers. That's our job. (...) we still have leftover from that old master."*	b)
	Service chief: *"...is our title correct, that it's supervisor: it feels that this customer would like to have somebody with a higher or better title. (...) like some title that would give a better picture to customer..."*	a)
	Human resource/personnel manager: *"I was thinking this matter quite far –that we'd be more like personnel managers and through that gain customer satisfaction."*	b)

	Contradictory role with multiple objects/supporter: *"This kind of model must be vanished from it. (…) responsibility must be given that if one has a broken tool so he goes to repository and gets one (…) This is something we must get off here and now settle these things out, so we really spare time to think how do we go forward with people."*	a)
6. session	**Business coach/manager:** "(division chief:) *We must take care that the objective is clear to them (subordinates) and as close as possible. I believe that we are going towards such an ad hoc organization; tremendously high educated specialists*	a)
	User engineer: *"(…) more closer to user engineer's job, he sits here at the office and uses those sheets that user engineer in the past planned those next season objectives."*	b)
	Competence developer/supporter: "(development chief:) *Everybody has learned that (analog tech) in technical school and after that everybody has kept oneself updated, but here it has been such a big change that one should like give new tools at hand. I don't know what is it about that role's point of view, but possibly it's changing something from coach to supporter; sort of supporter role or like that."*	a)
	Supporter: *"…our staff is so splintered, others [need more help/assictance] and others are tremendously independent and do whatever. The supervisor role cannot be that undirected either."*	a)
	Non-specified quotes by supervisors'.	

All above typologies are derived from the empiric data and they are not yet interpretative researchers' constructions. I also dear to claim that I have not made the typologies based on any conscious personal bias about management role, or picked the quotes randomly from artificial contexts. For a more comprehensive view, the reader may turn to Appendix A that provides the conversations where the previous quotes are from.

10.1 How to illustrate the emerging new role or roles?

But what can then be said about previous typologies? How to illustrate such multiple-looking role? If there are so many typologies for the role then in what phase of development is supervisors' work activity?

Obviously any single typology will not comprehensively describe or illustrate supervisors' work activity since supervisors use so many different typologies while talking about their role. Following table 15 is a summary about the numbers how many different explicit or implicit descriptive names were given to their work activity[20].

[20] I have counted these from my transcriptions, for example coach is mentioned several

Table 15 Amount of typologies

	a) implicit descriptive	*b) explicit metaphor.*
Number of different typologies:	10	9

As the previous table summarizes the role is named with rather many different explicit metaphors and implicit descriptions. It seems that their present role has become under crisis and they are trying to find out what the new role would be. *In terms of phase of development, their role is in a double bind: The old form of activity is in crisis, present model is inadequate and a new model ought to be constructed*. As the figure of expansive transition on p. 42 shows, this phase is characterized by secondary contradiction between the components of the old activity. Following cycle, figure 10.20, delineates roughly the cycle of expansive development of supervisors' activity and its current phase.

times but it is counted as a one typology; in that sense this is not any quantitative content analysis but a rough outline to just show that several different typologies and names are given to the role throughout the sessions.

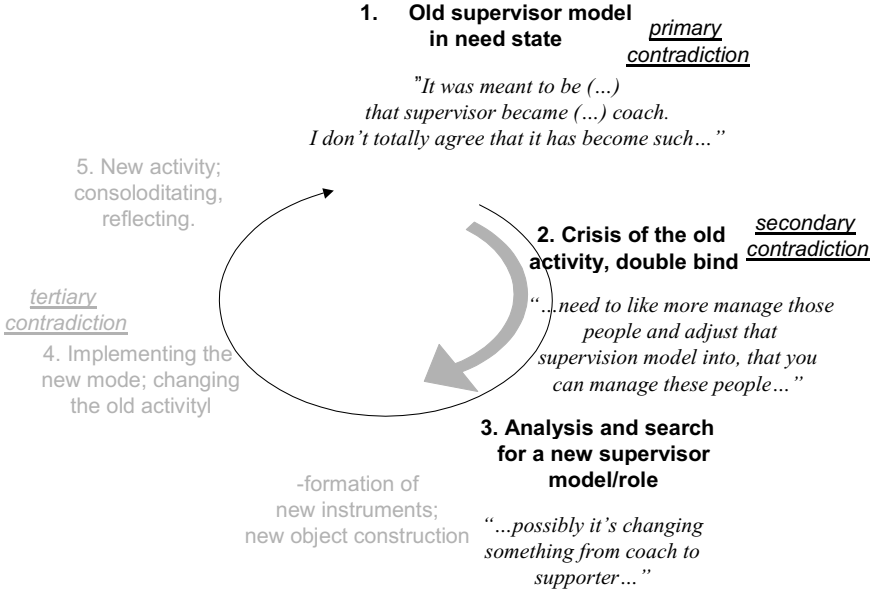

Figure 10.20 Phase of development of supervisors' role

Illustrating supervisors' role is difficult since it is not something clearly defined and ready or static. Actually, the competence laboratory sessions constitute a large expansive learning cycle with multiple epistemic learning actions that aim to illustrate the zone of proximal development of supervisors' role. The zone of proximal development is the basic category of expansive research (Engeström 1987, p. 141). The supervisors' role is constructed through exploring the zone of proximal development, which is explored through the phases of expansive learning, and epistemic learning actions, described earlier in my paper. Engeström (1987, p. 174) defines the zone of proximal development as "the distance between the present everyday actions of the individuals and the historical new form of the societal activity that can be collectively generated as a solution to the double bind potentially embedded in the everyday actions." As the reader might have already noticed one cannot define the zone of proximal development in advance; the supervisor role is therefore possible to locate only by examining the historical contradictions in the activity system and examining the attempts to solve these contradictions. This is eventually what competence laboratory process

and taking collective learning actions has been.

10.2 Supervisors' emerging zone of roles in second-generation knowledge management

The emergence of supervisor role is hence an attempt to solve the contradictions in supervisor work. Illustrating then the whole complex and rich zone of proximal development seems to be the only way to crystallize the supervisor role in this ambiguous developmental phase. The following figure 10.21 outlines the zone of proximal development. It depicts the two dimensional expansion as in the figure of two generations of knowledge management presented earlier; the vertical axis illustrates the social expansion, and the horizontal axis illustrates the expansion in the object of work and expansion of knowledge.

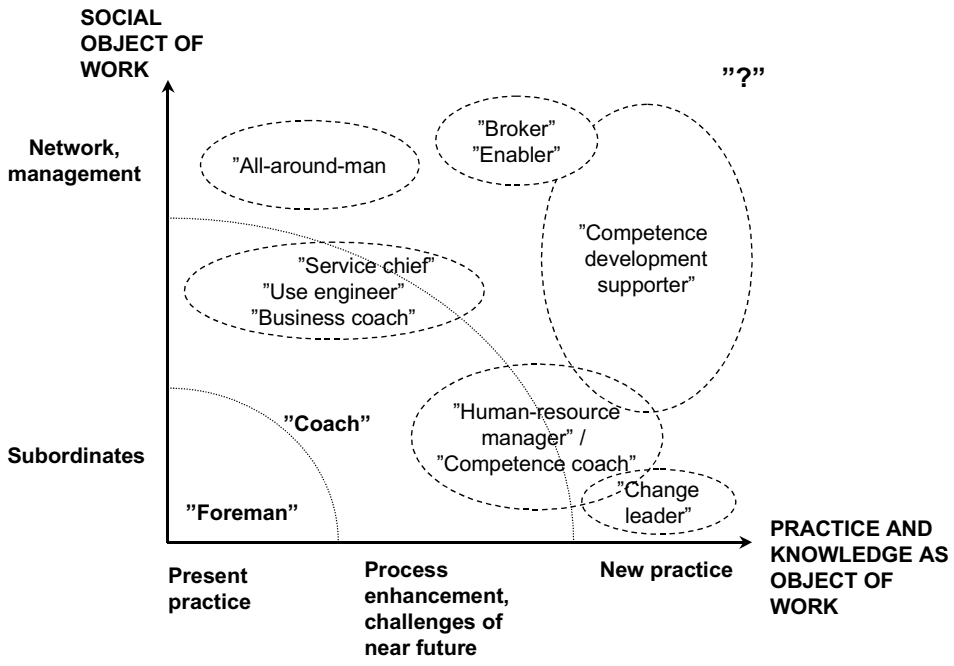

Figure 10.21 Supervisors' zone of proximal development

Foreman presents the traditional old master who was superior in technical competence, and worked with subordinates in static environment in this historical type of work. Foreman was master of the analog technology, which

he knew better than his subordinates. Now the situation is opposite, supervisors' subordinates have gone ahead in their technical competence, and sometimes supervisors do not even know how some digital installing procedures are to be made and how the digital technology fundamentally functions. During the historical 'foreman' model the speed of change was not that rapid as it is now. As the horizontal axis illustrates the supervisor role is now in a phase that entails development of new practices and innovations: when for example new product or novel technological solution is introduced into work practice it means that also innovations in work practices are also to be developed.

All the change ideas that were proposed in the sessions deal with several aspects in the overlapped role. The three selected change (see p. 70) ideas represent different aspects of the role. Delegating refers to coping with the social expansion of work and is manifested in the 'broker' role. Planning of meetings in the division refers to how to support subordinates (manifests in 'competence development supporter'), and coach them (manifests in competence coach) during the rapid change. The idea to develop supervisors' own competence and training refers to coping with the expansion in horizontal axis, that is, in new knowledge and technological innovations as is manifested in the 'change leader' role.

Especially attempts to solve following contradictions have created such overlapping zone of proximal development:
1) Contradictions in division of work: Coach model presumed an organization with small teams, however now the unit is organized into too large teams to enable any personal coaching.
2) Contradictions in tools towards the community: subordinates are most of the time in the field where they remain invisible, supervisors rarely meet them since they themselves do not work in the field anymore as before. Tools ought to enable better and more frequent contacts towards subordinates to enable 'obligating' them to work in a more customer-centered manner and to

enable them to 'deal customer as a whole'.
3) Contradictions in tools and subject: Supervisors' do not master the technical expertise anymore and cannot provide technical help for their subordinates. They ought to have such tools that would enable them to cope with the expansion of technical knowledge, and speed of change in new products.
4) Contradictions in community: Cooperation ('broker', 'enabler') is more central part of supervisors' work nowadays and staying in touch with various network partners inter-organizationally and intra-organizationally takes more and more of their time.

When it comes to activity theory it is the object of activity that is the defining character of the activity (see e. g. Engeström 1987, p. 89), not the community as it would be in terms of community of practice (Lave & Wenger 1991). Moreover, leadership metaphors and such neglect the analysis of the object of leadership activity, which is more than managing of subordinates in objectively defined situations. The object of supervisors work activity is much more complex and interrelated with the object of top-management. The object of the activity is also societal motive of the activity and connects it to other activities (Engeström 1987). The inner contradictions in supervisors' work activity create the motive of the activity and set an agenda for development and emergence of new activity. I have already mentioned several contradictions in the description, which are rather visible in the coding and transcription since they emerge through learning actions and set agenda for the development of the activity system, respectively, supervisors' zone of proximal development. These inner contradictions help us also to understand the formation of new activity systems in network of activities. The emerging supervisor role is clearly involved with several cooperation partners in the network that produce different components into supervisors' activity. Hence, contradictions set the agenda for the future development of societal new activity system. This agenda setting is also part of the emerging new role. As in market economy and turbulent telecommunication industry

that creates these contradictions and tensions for supervisor work activity, the elements of supervisors' activity system are also elements in the system of market exchange.

10.3 Conclusion: role is constantly transforming

Summarizing the previous, I conclude that: a) the role is in a phase in which a new model is been explored. b) The model is explored from two dimensions, that is, how to cope with social expansion of work and the expansion of knowledge and new work practices. This expansion and phase of exploring a new model became evident also during the seventh follow-up session of the competence laboratory project.

Function of the seventh competence laboratory meeting is partly to adjust and redevelop change ideas and implement new model developed during first six sessions. This session was reserved for the evaluation and follow-up analysis of the three selected change ideas that were chosen as a part of developing leadership activity in the division. End part of the seventh session was used to collectively (both supervisors and division's top-management present in the session) analyze and question the figure of supervisors' zone of proximal development. My analysis and interpretation of supervisor role was done already before that final session. This gave me an opportunity to question the respondent validity of my interpretation. In terms of methodology and my study, this seventh session acted also as a collective analysis and questioning of respondent validity.

Interventionist showed the figure of supervisors' zone of proximal development for the participants. She provoked analysis about the figure by asking whether they agreed with the conclusion that illustration of supervisor role needs to be done using zone of proximal developmental to capture its overlapping nature. She asked how they would themselves name the developing new role. They agreed with typologies in the figure but added such descriptive names as 'securer' or 'responsibility taker'. Especially it as

agreed that work is expanding two-dimensionally. Technical chief commented that supervisors' must understand that uncertainty is the name of the game, and it must be accepted that their role is layered and that work cannot be solely based on predefined and analyzed decisions. Another member from top-management mentioned that supervisors need to both take care of defined business plans but simultaneously must cope with changing competencies and enable contacts and fluent co-operation between different players. Part of their work is to implement defined strategy while other part is to make innovations in daily practice to be able to cope with the pace of change. One supervisor also said that subordinates' competence is also a small problem: some of the subordinates consider supervisors as 'retired old men' who do not know anymore what is going on in the field while other subordinates still consider supervisors as former masters.

The final follow-up session confirmed or verified the validity of my analysis. Supervisors' role seems to be constantly developing and new typologies are emerging while the object of their work changes and expands, as showed in the figure of zone of proximal development. Also, the nature of strategic planning is changing due to expansion in technology. As the technical chief said the competence development is difficult since it is slow and new technologies emerge all the time, one can only predict which one of those techniques will be dominant in the future. *All these arguments denote change and expansion, and that defining a clear supervisor role with a single and static typology is rather impossible.*

With this analytical tool provided by the interventionist, the participants were also able to develop further their ideas. It opened a perspective of development for the participants acting as cognitive stimulus to analyze further their activity, explore the zone of proximal development. It could be summarized that the validity of intervention research and my study as well, is not validity which contents merely to explain a situation, but the validity

of an intervention research findings come from their pragmatic use value to develop practices further.

11.0 Discussion: normative management models seem inadequate.

My following analysis based on several normative supervisor roles adopted from management literature show that any single role could not illustrate supervisors' role in this developmental phase. Each model at a time only enables partial interpretation of the role and leaves the contradictory and overlapping nuances out from the picture. The motive for the following analysis is to show the inadequacy of normative management literature to explain the nature of supervisor role in a high technology telecommunications company characterized with rapid changes in grass root practices, products, markets, and technology. I argue that one cannot depict the emerging role with single typology or role concept.

11.1 Are supervisors process enhancement coaches?

In this chapter, I analyze what kind of historical work type supervisor's work activity presents. For conceptual framework I have taken here historical ideal-types of production from Victor & Boynton (1998).

Supervisors seem to be near process enhancement, though having some potential fractions also from mass customization. In process enhancement teams are usually set up to focus members of the team to improve work processes (e.g. Victor & Boynton 1998, p. 11; this was also one of the fundamental ideas in quality movement that Japanese management scholars initiated). Clearly one can see a link here to supervisors' work. For example, the production meeting that one supervisor mentioned as his tool obviously serves this purpose: everyone would take part into how work could be organized better. Change is the norm and rule in supervisors' work, similarly as in craftwork architecture in which also innovation and creativity have major importance (ibid. p. 27). Craftwork is highly based on individual, master's, tacit knowledge, which the subordinates -apprenticeships- get to

know through socialization (refer to Nonaka & Takeuchi 1995 knowledge creation), first taking part into the work activity only from periphery by observing (Lave & Wenger 1991). Supervisors' are no more masters of technique as they used to be. Moreover, the work is no more based on mere tacit technical know how, but into codified rules and more architectural knowledge about the work processes. However, lot of the knowledge is still embedded into the actual practice in which it is also created (as in second-generation knowledge management). Supervisors' also create individual tools in their work practices, such as certain kind of meetings; these tools if exploited collectively might also strengthen work practices in the whole division. Nevertheless, craftwork is still alive in some way in the present work: one example of this is supervisor's role as 'problem solvers' to quote them. This would imply that lot of knowledge about the production is still tacit since differing customer claims cause one-time occurring problem solving situations.

Actually, the fact that also subordinates (installers) are becoming specialists would also imply that craftwork is present in the field work. Installing, say, a digital modem connection, does have codified procedures but the installing situation as a whole cannot be totally codified (customers' homes are different, customers themselves have different needs etc.), which would imply that subordinates hold lot of valuable tacit knowledge for example how to deal with unique problematic customers etc. It was also mentioned that specialization in work and tasks will go even further and one potential supervision role in future would be manager of specialists, so-called adhocracy. Reasons for this are the rapid technological change in competencies, supervisors' cannot keep up with the technological pace in terms of actual installing procedures what they used to do; they have to concentrate more into managing subordinates in such a manner that provides high quality technical installing and customer service.

Accordingly, work in the unit does have some elements from craftwork.

However, process enhancement seems to be dominant. In telecommunication industry products are also in a mature state of lifecycle, which would imply mass customization. Nevertheless, customers already value something else than mere standard features. Creating high quality products and services is also Telecommunication Corporation's objective, respectively home customers and technical help division. Example of car repairing production that the installer would deal the customer as a whole as mentioned in the description chapter, also implicitly refers to this kind of dynamic and quality oriented production. Process enhancement is hence based on high quality in service, this means that also line workers participate into production improvement. In supervisors' role this can be seen quite clearly in the way they try to manage their subordinates so that customer service and high quality technical competence would be present all the time. Obvious this is especially how they try to run enough meetings to make this clear for subordinates.

Victor & Boynton (1998, p. 75) write manager's role in process enhancement along these lines: "Managers are coaches constantly beseeching workers to interact and observe, to do and to think, and to focus on finding the best way to do the work. Unlike the passive supervisors of defined procedures and machines (as it would be in mass production), process enhancement managers are active enablers of process change." (Victor & Boynton 1998, p.75; parentheses and underline by me.) By no means, this description fits rather perfectly with previous supervision descriptions; enabling processes to run and manage change all occurred in the intervention project. Supervisors' work indeed consists of constantly influencing subordinates and 'obligating' - as they say- them to internalize company's vision to have high-quality customer service. Delegating, running meetings, brokering, building contacts between right people, all these are their tools to manage process enhancement work. However, change in technology, products, legislation, and change in market structures is also one reason for their role of enabling the change. Simply, the change is constantly present in their work.

Process enhancement is in large extent based on practical knowledge, as the figure shows. This practical knowledge "allows the organization to identify weaknesses and fix them, respond to slight changes in product requirements quickly, and identify new sources of customers." (ibid. p.75.) Practical knowledge refers here into knowledge about the processes and how they should function. Hence, it is explicit and collectively exploited to enable process enhancement work go fluently. Fast product cycles are one of supervisors' headaches in customer service division; changes are constantly present, though new products change the product somewhat differently as process enhancement description would first presuppose: the products themselves bring new knowledge into the work. This knowledge, embedded into these material artifacts, cannot be therefore identified beforehand. However, knowledge from processes and how they should run to produce high quality products and services obviously increase the problems what new product concepts bring along. Actually, a new product can change the whole work concept in a more systemic manner. It brings in new cultural elements from tool producing activity and may thus cause contradictions between two activity systems.

Following figure 11.22 presents historical ideal types of work (adopted from Victor & Boynton 1998):

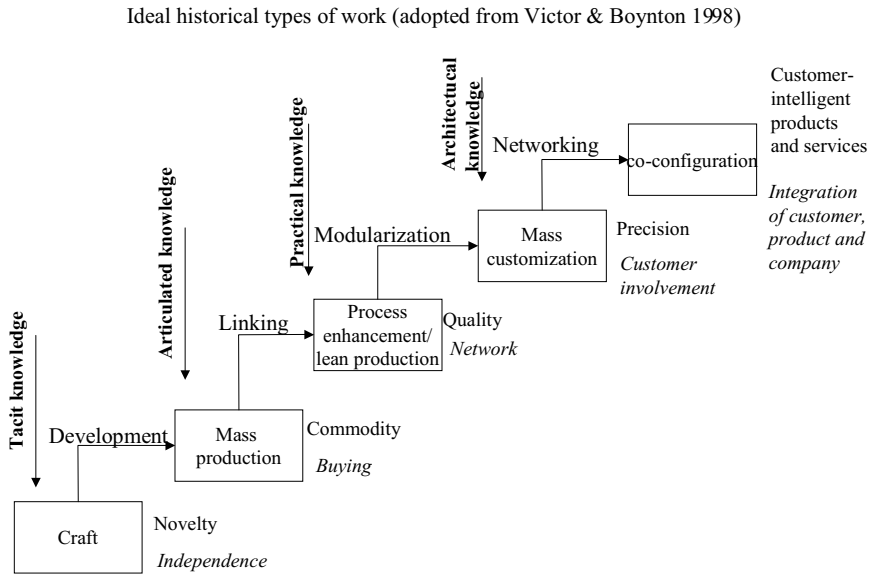

Figure 11.22 Ideal-typical historical types of production (Victor & Boynton 1998)

Victor & Boynton (1998) maintain, "process enhancement is the design of work for both doing and thinking. It is based on the practical discoveries of workers intimately familiar with the process..." (ibid, p. 77; underline me.) This manifests itself quite clearly in how supervisors' have to cope with the problem in competencies; installers should be able to both have superior technical competence ("doing") and high quality customer service ability ("thinking"). Supervisors therefore struggle constantly with the management question of how to supervise in such manner that would provide both these factors; this is also one of the major factors in the emerging new role -new tools, ways to organize work, and cooperate are needed to fulfill the demands of discontinuous change (referred earlier in this paper). Furthermore, "both doing and thinking" is more fundamental issue especially now when new knowledge, that is created in practices through this "doing and thinking", is a strategic issue. This "doing" refers also that supervisors' try to design the processes collectively with their subordinates, especially change enterprise ideas of common meetings with workers from several positions in the division and division's design team imply this. Futhermore, the meeting map

idea is manifestation of an experiment to manage the whole work processes in the division, that is, to provide such tool that would make supervision more effective. It is also a manifestation of a tool that would provide a "common vision across processes" (ibid p. 81). Also all supervisors' quotes of 'giving more power to dispatchers', sharing decision making, and giving more responsibility and autonomy to subordinates refers to such work model in which management is not responsible of everything, does not act like a master. It refers into such work model in which "people themselves should be initiating and sustaining the activities" (ibid p. 82). Also other change enterprises, such as delegating, refers to this: supervisors ought to delegate more responsible tasks to subordinates to enable such flexibility that would provide the high quality technical and customer service competitive advantage in the markets. All these tools are indeed needed since Telecommunication Corporation and home customer division must respond quickly to shifts in market signals and cope continuously with new process and product requirements. For this supervisors and the whole organization needs architectural knowledge of the processes (ibid. 89). Clearly, this is also one of the implicit products what the competence laboratory provided for the division. Also, supervisors' emerging new role and need for different kind of tools and ways to organize work refers to a need to have architectural knowledge about processes. However, I claim that this interpretation does not do fully justice for the rich content of supervisors' work reflected in the empiric chapters of my study. Hence, the answer to the question in my title is: yes, but only partially.

11.2 Are supervisors middle-up-down managers?

Figure on supervisors in the center that I presented earlier in the description chapter, illustrates supervisors' broker-role. It shows clearly some similarities with the middle-up-down design. Firstly, it shows that supervisors are constantly negotiating between several actors as in middle-up-down setting. Secondly, it illustrates that supervisors are also theory

builders, that is, their role is to implement and explain the strategic visions forward: They have to manage their subordinates so that the visions and values (such as customer service and high technological know how) of the top management actualize in the field. Accordingly, they play somewhat similarly as knowledge engineers who "synthesize the tacit knowledge of both front-line employees and senior executives, make it explicit, and incorporate it into new technologies, products, or systems" (Nonaka & Takeuchi 1995, 155). It ought to be pointed here, though, that the supervisors in my study do not incorporate that tacit knowledge straight into new products or systems, as is the case in Nonaka & Takeuchi's (1995) book, which mainly deals with product development team setting. Clearly they e.g. synthesize the tacit knowledge from the front-line employees and make it explicit but that knowledge fits in into new work procedures or such. Actually the emerging leadership role is also a reflection of knowledge gained from the front-line, supervisors need to synthesize that tacit knowledge into a new leadership model since the old model seems inadequate.

The strategic management's vision is consequently slightly different from the actual practice. Especially, when it comes to the self-directedness and autonomy in decision-making among supervisors the autonomy has opposite effects that it should have. Supervisors' contacts to strategic management have diminished which has consequently initiated feelings of isolation in supervisors. Moreover, the top-management does not necessarily know about all the details what are really happening in the customer surface and in the field. Supervisors seem to think that all they do is make visions up there. Additionally, the new tools created in the competence laboratory and novel ways to organize work imply that supervisors try to create space around them to enable such role to emerge in which they could act more middle-up-down model like.

Nonaka & Takeuchi name several capabilities that middle manager in middle-up-down model ought to have. An actor as active subjects is one

attribute. This is also visible in supervisors' work: they indeed are themselves active subjects. Furthermore, they attempt to manage their subordinates to become more as active subjects. This is also rather obvious in my description chapter, one of major contradictions in present supervisor model is how to manage subordinates so that they can actively serve the customer as a whole. The ideal state would be that subordinates could actively self-manage; supervisors would just be there to give the direction. Other capabilities that middle managers according to Nonaka & Takeuchi (ibid) ought to have is sufficient communication skills to encourage dialogue between their subordinates in order to hear and see whether new knowledge is created and whether they mediate top-management's strategy to 'what is' level effectively. Example of this in supervisors work activity is their frequent use of development dialogues: it is one tool to mediate strategy below and modify top-managements 'what ought to be' into understandable concepts to front-line. Also the ability to create trust (refer again to table 2) is obvious in supervisors' work: in the historical model supervisors had more actual contacts with subordinates, for example there were more informal coffee breaks that provided valuable space for social contact to influence them and mediate strategy further. Nowadays those contacts are more rare which create feelings of anguish among subordinates but also among supervisors themselves. Creation of trust is essential to make situation clear that management has not neglected them and that it takes into account what goes on in the front-line. This is of course not always so easy, especially now when installers (subordinates) technical competence has gone ahead of supervisors' who thus are not able to be masters anymore, as in history. Again, the answer to the question of this chapter's title explains supervisors' work activity only partially. Middle-up-down management model seems also inadequate.

11.3 Are supervisors change or transformational leaders?

I mentioned earlier in my paper six change factors, or 'destabilizing events'

that trigger large scale changes in organizations. These factors are rather visible in the formation and development of new supervisors role, especially these change factors manifest itself as developmental contradictions in supervisors' work, thriving pressures for transformation and development of the activity. My earlier figure, which illustrates supervisors as explaining change in the center, visualizes the presence of several change factors. It goes also rather near to middle-up-down management model. Nevertheless, the figure shows that supervisor role is also emerging clearly more towards a change leader; one of their major tasks is to motivate subordinates to update their knowledge and competence on technical issues in order to maintain high-quality technical service for more demanding customers. Part of the change leader aspect is also making the situation clear to subordinates, that future is unpredictable and one must understand that change is faster and present all the time. One mean to implement change and make subordinates understand change is dialogue; "through that [talking] you really get people involved", as they mentioned in the 5th meeting.

The change implies that subordinates ought to gain more autonomy and decision-making freedom as the example of "subordinates as car repairers" illustrates. Here the role goes also rather near to a leadership theory named as transformational leadership[21] (see Bass 1995). It is another leadership fad that came up during 80's and 90's (Gronn 1997). Obviously, it emerged as an attempt to solve some of the challenges of learning organization to enable organization members to focus on learning for the benefit of collective[22]. As Gronn (ibid. p. 3) delineates "transformational leaders create learning opportunities for their followers and stimulate them to solve problems in

[21] I do not dispute whether the transformational leadership and its background are theoretically valid or sound related to my study or whether it should be. I state that leadership theories as such are not in focal point in my study. The interest is into emergence of a new leadership model in a genuine second-generation knowledge-management framework. I do not attempt to do comprehensive literature reviews about leadership theory and practice and conceptualize a new theory based on previous attempts, for these there are vast amount of leadership literature available. However, my interest is to try to find something new from my empiric data in order to delineate and understand what does leadership mean in second-generation knowledge management, and towards what is it transforming?

[22] For attempts to solve challenges of a collective vs. individual learning several theoretical constructions have been made; my paper also deals with these issues in my presentation of knowledge management.

their own way, to the extent that followers become capable of leading themselves." The previous quote does have contact surface into my empiric case as well. This somehow ideal-state of installers as autonomic subjects, as the "car repairer" idea exemplifies, manifests itself in supervisors' work activity through several contradictions. For example, supervisors' should be creating these learning opportunities and obligating installers through meetings as coaches and simultaneously designing installing capacities and work organizing as "user engineers." Moreover, this is part of a wider framework of how to enable high-quality customer service despite the speed of change. Also change leader model or role seems to be inadequate. I shall move to my last interpretation relating supervisors to concepts of community of practice, which is rather central notion from second-generation's point of view.

11.4 Are supervisors' a community of practice?

In this chapter, I will analyze supervisors' work with one rather central notion in second-generation knowledge management. Community of practice is not itself a new emerging role but one component among other components in the emerging new activity system; here especially it may be used to explain and interpret supervisors' work activity's new division of labor and community in second-generation knowledge management framework.

Community of practice has been an outcome of research on apprenticeship, but the notion has been adopted into wider context of learning on-the-job and knowledge management (especially Wenger 2000). The concept of legitimate peripheral participation is as an interpretation tool quite central here; especially it directs our attention towards the fact that the old 'master supervisor' model may be like that. The legitimate peripheral participation is a rough equivalent on situated learning or learning-by-doing, however it differs from those other terms underlining that learning happens as

"legitimate peripheral participation in communities of practice". (Lave & Wenger 1991, 31.)

"...new organizational form is emerging that promises to complement existing structures and radically galvanize knowledge sharing, learning and change. It is called the community of practice. These are groups of people informally bound together by shared experience and passion for a joint enterprise – (such as)...frontline manager in charge of check processing at a large commercial bank." (Wenger 2000, p. 139. additional parentheses Mäkinen)[23] Previous statement has several implications into my study and interpretation: First of all, it shows that competence laboratory itself cannot be a community of practice since it is formally and deliberately constructed space for joint enterprise. However, it has several characteristics from community of practice, especially that it definitely aims to capture, change, and share learning taking place in everyday practices. As my description shows, supervisors also participate into practices of informally bound communities of practice. The informal organization is a clear manifestation of such; also more informal meetings that supervisors organize resemble community of practice, since it is more or less a group of subordinates and supervisor that informally get together, though after supervisor's initiation.

To understand work and learning it is necessary to focus on the formation and change of the communities in which work takes place (Brown & Duguid 1991). My analysis of supervisors emerging new role must take into account also this; clearly the new supervisor role must be analyzed also how their work is organized (division of labor) and with what communities they interplay. Moreover, abstract knowledge only has power in specific circumstances (Lave & Wenger 1991, p. 33). This previous point about abstract knowledge stresses the fact that learning is not something apart from everyday life, such as abstract knowledge that can be generalized and

[23] This quote should gives rather simplified and populist interpretation of the term (for popular management journal that is Harvard Business Review), despite the fact that it is much more problematic and hazy.

transmitted from master to novice. Belief that everyday practice and learning are two separate issues ought to be kicked out –new knowledge creation and developing actively new tools, such as meeting map, are all about learning in practice, in every-day. As Lave & Wenger emphasize the analytic focus should be shifted "from the individual as learner to learning as participation in the social world, and from the (narrow) concept of cognitive process to the more-encompassing view of social practice" (ibid. p. 43, parentheses Mäkinen). Clearly, this is also what activity theory implicitly has in mind; learning is definitely social, but also cultural and historical, activity and practice.

Communities of practice are informal groups (Wenger 2000, p. 139). What does this actually mean? Is not informality something quite ambivalent and difficult to get a grip on? Moreover, what kind of tension is there between the formal and informal? The informality could be said to be as the doing and acting on every-day basis, that is, the every-day collective practice. My data shows how management has actually gone more towards formality, especially when considered supervisors' and top-management (division chief) relation. Especially third competence laboratory meeting shows this. Furthermore, the synonym for formal would be institutionalized practice. Now these informal coffee breaks as means of supervision or management have diminished or they have been replaced by formal meetings (due to several change factors that I have mentioned elsewhere). If the communities of practice are informal, as opposite to institutionalized formal teams that are top-down managerial instruments to enhance production and work, how can they be nurtured or sustained –since after all that is what they are worth? Wenger (in 2000, p. 144) paradoxically writes that they can be fostered through administrative proceedings. She uses rather vague metaphor of cultivation: "Like gardens, they respond to attention that respect their nature." (Wenger 2000, p. 144). Obviously the cultivation refers to potential organizational culture, organizational structure or type of production, etc, that might foster the emergence of communities of practice.

Wenger (ibid.) comes up with three simplified and "practical" guidelines for managers: "1. Identify potential communities of practice that will enhance the company's strategic capabilities; 2. Provide the infrastructure that will support such communities; 3. Use non-traditional methods to assess the value of the company's communities of practice." Interestingly supervisors emerging role is going towards more autonomic model in which they and their subordinates have more decision-making; this might also foster them as 'active subjects' also form such communities of practice.

Communities of practice are hence highly informal networks of individuals within an organization and this informality enables them to take care of problems before they are recognized institutionally (Wenger 1998, p. 252). An interesting finding from supervisors' work should be mentioned since it gives us an idea about relevancy of the term again from the point of view of informal organization: Supervisors see the official organization as a mere hindering when it comes to taking care of daily routines and problems, as description in fourth meeting shows. They consider that if something needs to be done quickly one cannot do it through official (institutional) guidelines. This raises a question whether this kind of work activity which seems to focus merely on situational problem- solving neglects the more systemic and theoretical way of seeing one's daily work as continuing practice with fatal consequences in long term work productivity and efficiency?

Moreover, as Wenger notes (1998, p. 255) "the brokers across boundaries are often the first casualties in the reorganization". Supervisors' position is broker-like as already mentioned. They are in the between the operational core and strategic management as the analysis with middle-up-down management shows. One of their common tasks is solving problems between several actors, e.g. between dispatchers and telephone installers, or customers and helpdesk. Moreover, the historical change in Telecommunication Corporation shows that the reorganization has "wounded" the managerial work perhaps the most; for example, the

corporation has reorganized small teams that each supervisor had before in a community of practice manner. Also, the intra-corporation's new business units have influenced supervisors' cooperation network. Moreover, the boundaries create new interplays of experience and competence and they are therefore the likely locus of the production of radically new knowledge (Wenger 1998, p. 254). I claim that this supports the reason why communities of practice should – and are – be taken into account in the knowledge management perspective as well. Clear example of such boundary encounter is how supervisors' try to enable cooperation between several partners; supervisors have tacit knowledge about who are the actors that hold relevant knowledge needed in inter divisional cooperation.

Communities of practice are therefore organizational assets since they are the social fabric of learning (Wenger 1998, p. 253). In communities of practice the focus is into people and into their everyday learning and practice, thus into the informal part of leadership and management strategy that cannot be measured with quantitative surveys but analyzing the actual work activity which also is one major tasks of competence laboratory.

Boland & Tenkasi (1995, p. 351) use "Community of Knowing" to illustrate community of specialized knowledge workers in organizations with specialized technologies and knowledge domains. They mention also communities of practice but emphasize "with the interaction of different expert knowledge groups in the process of knowledge creation, we feel 'community of knowing' is the most appropriate label for our purposes." (Boland & Tenkasi ibid, p. 351-352.) They concentrate more into the linguistic and narrative knowledge creation than into the actual practice, whilst referring to open systems theory, meaning that communities of knowing are in relationships among themselves. Clearly community of knowing can be used to interpret emerging new supervisor role: as the description of my data shows, tendency is towards managing more specialized individuals, towards adhocracy in which subordinates obtain

high technical competence which is far from what supervisors know anymore.

In this sense, it differs quite from communities of practice, which have the practice in the focal point and uniting factor: Formation of communities of knowing are sustained and formed in narratives and language games (ibid.). Moreover, they emphasize perspective making and collective language games within the communities. They speak out that; "community of knowing requires perspective making in order to do knowledge work." (Ibid. p. 355.) They continue, that for the perspective making the community needs a space for conversation and action isolated from the larger organization (ibid.). A competence laboratory can be such a space, but also supervisors running meetings and having constantly development dialogues with their subordinates implies that perspective making is highly important part of supervisors' activity. What supervisors actually do is an attempt to build such perspective for subordinates out of top-management's strategy that would make possible the ideal state that subordinates would be both high-qualified customer service persons and technical experts.

I have now provided several attempts to illustrate and interpret supervisors' work activity and their emerging role. None of the previous, however, seems adequate. I shall now propose my final conclusions and illustrations of how the supervisor role could be characterized, what I claim, as best.

11.5 Conclusions: normative models do not give full justice to supervisors' role

Hitherto, I have offered several interpretations of what the emerging supervisor role in second-generation knowledge management might be from the point of view of a one single model presented in management literature. Whether the supervisor is a) broker (Davenport & Prusak 1998; Wenger 1998), b) process-enhancement coach or enabler (Victor & Boynton 1998), c)

middle-up-down manager (Nonaka & Takeuchi 1995), d) change leader (Nadler & Shaw 1995), e) stage-director (Senge 1990), or f) conspirator or caretaker (Vermaak & Weggeman 1999) is not the question. One could go on with the metaphors without tackling the most important question that these superficial, and rather tentative metaphors[24] would leave out, that is, what kind of systemic whole is the supervisor role?

In conclusion, I claim based on my previous description and analysis of my research data that supervisors' role;
a) cannot be illustrated or depicted with any single or normative role concept;
b) is layered and overlapping;
c) emerges through collective analyzing and questioning of the work practice, being simultaneously also in a dissipating phase;
d) changes when the object of the activity, and other management, in the whole division changes.
When examining my major findings let the chapter 10 speak for itself and the collective respondent analysis that was conducted in the seventh follow-up session. They verify that illustrating role as a zone of proximal development, which captures different nuances and expansion of the activity, captures the nature of the emerging role.

12.0 Reliability & validity

When it comes to reliability, formation of scientific knowledge should be taken under scrutiny.
Several different statements about the nature of scientific knowledge and validity have been made[25]. For example, Hammersley comes up with three

[24] Morgan (1995) goes on to define organizations through metaphors showing also the problematic of using metaphors.
[25] One example of this are Kuhn's (1970) classic thoughts about scientific revolutions and how new scientific paradigms emerge as collective and gradually more socially expanding activity.

problematic points that should be taken into account while assessing validity (1992, p. 50-51):

1. Validity-confidence in our knowledge
2. Reality is assumed to be independent of the claims researchers make about it
3. Reality is always viewed through particular perspectives.

Obviously, research and creating new knowledge in scientific activity does not happen in a void or in an isolated environment, but are an outcome and a product of various forces; objective knowledge does not exist as such. In this sense, research in terms of objective reliability is impossible. One could go on with post-modern speculations about the nature of scientific knowledge and death of subject. To refer popular jargon about Foucault, are we unconsciously mere objects of different hidden intellectual forces that direct our way of seeing and interpreting the world? Foucault proposes that such "positive unconscious of knowledge: a level that eludes the consciousness of the scientist and yet is part of scientific discourse" should be revealed (Foucault 1970, xi)[26]. Should we deconstruct ourselves as researchers to be able to 'see' those 'meta-narratives' that direct our scientific inquiry? Obviously, becoming a scientist prerequires first becoming an object of scientific body of knowledge, and didactic forces that socialize (or in some cases indoctrinate) students into implicit presumptions about proper science and ideal-typical research. Basically, what is the question here is how researcher becomes a practitioner and a member of a scientific community[27], and how he adopts those rules and conceptual tools used in a research community.

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[26] This goes rather near to conceptual definitions of tacit knowledge which seems to be often used as it would be a clear concept (here I refer to Spender who points that tacit knowledge is not merely individual but also embedded in collective practices, see Spender 1999); both this positive unconscious knowledge what Foucault proposes and tacit knowledge, share similar idea that forces that direct our thinking are internalized through forces of socialization that a subject unconsciously internalizes. However, activity theory according to Vygotsky's idea of mediation (1978) takes artifacts and tools into focal point showing that it is also through use of these culturally and historically constructed and more advanced tools (whether material or conceptual) that our thinking transforms and develops.

[27] At this point of my studies, I consider myself as a legitimate member of a scientific community. Personally, my process of becoming a member of this community has been

Also, intellectual activity itself has certain interests, ambitions, or prerequisites that are a product of historical, social, and cultural occurrences. As Mannheim points, situation in social sciences "is this intellectual interest, oriented in a matrix of collective activity, which provides not only the general questions, but the concrete hypotheses for research and the thought-models for the ordering of experience." (Mannheim 1936, p. 5.) Researcher does not do his/hers thinking in isolation but in a certain group of individuals, researchers, students, or such. Mannheim (ibid, 3) strongly asserts that it is incorrect to say that single individuals would think: "Rather it is more correct to insist that he (a researcher e.g.) participates in thinking further what other men have thought before him." (ibid, 3, parentheses me). I claim that this is exactly what also my study ought to accomplish, that is, further thoughts on knowledge management and supervisors' emerging role in high technology environment.

I could also depict my study's body of knowledge placing myself as subject within research activity of a scientific community. In this case, the tools of my research have been activity theoretical conceptual tools, as well as my professor's guidance among fellow researchers at the center for activity theory and developmental work research. Already this shows that scientific knowledge is also historically and culturally mediated and embedded in (linguistic) practices of a community of researchers. Master's thesis and knowledge it creates, does not occur in a void but is constructed socially and in collective practices (when paper is discussed publicly in a classroom or with professor for e.g.).

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somewhat similar as the process of legitimate peripheral participation described by Lave & Wenger (1991). I started my master's thesis as a legitimate peripheral observer of the scientific community, first by attending small group sessions of the intervention researchers at the center for activity theory and developmental work research. Later I took part also into 'core practices' of the research community, keeping conference lectures and writing a research report, which this thesis is manifestation.

These previous arguments affirm that speculations about whether objective knowledge is way to assess reliability are somewhat superficial and naive; scientific knowledge is a social construction, product of a certain scientific community, and does not have universal objectivity. What is more essential from the point of view of reliability of my study, however, is that are my interpretations and my descriptions of supervisors' work visible and clear for the reader, and can the reader assess if my interpretations are reliable? I formulate analysis of the reliability in my study into following essential questions:

(1) Does the reader have authentic and 'clear' picture about the process, that is, supervisors' work in my research site?

(2) Are my interpretations and conclusions driven from the data interesting and valid?

(3) What does my research object, supervisors themselves, say about my interpretations and illustration of their role (respondent validity); and does the findings of my study help participants develop further their practice (validity in developmental research)?

Maybe these questions able me to keep my feet on the ground and avoid ambiguous theoretizing about validity (which I already did in some extent); actually remark about my previous questions should be made, that perhaps they itself might not be valid. Consequently, question of validity or reliability is also question about how they are socially constructed (see e.g. Kvale 1995). Some authors have also argued that processes of 'so-called' validation should be treated as yet another source of data and insight (Silverman 1993, p. 159).

I argue that all the previous three questions that I proposed for the analysis of reliability and validity of my research may be answered quite positively. My description of the intervention process and conversation transcriptions of supervisors 'charting their role' give fully justice to work activity as it appears in the 'real world' in the technical customer service and home customer division. These transcriptions also show that typologies,

illustration and interpretations I have made about the emerging role are driven from the actual data, and not arbitrary from my bias. Another question is then whether my analytical and methodological decisions have been suitable for this data, and whether different methodological instruments could have been used? By no means, of course the data could have been analyzed using some other analytical proceedings. However, I maintain that my decision to use learning actions as an analytical schema captured dynamics and complex structure about the object of my study. I presume that different kind of qualitative content analysis could have captured the object of my study less 'naturally' since the intervention data already had certain qualities for which using learning action schema suited well.[28]

During the last follow-up sessions of the intervention process the respondent validity was collectively questioned, the figure of zone of proximal development was presented and analyzed collectively with supervisors who agreed with my illustration of their overlapping and layered role. This so-called respondent validity (see e.g. Hammersley 1992) proves that my analysis and interpretations from the data are reliable and valid, especially in relation to the object of my scientific activity. I discussed already earlier about the respondent validity, but to conclude it is more than mere explanatory validity: the interpretations gave new ideas and food for thought for the participants to develop further supervisor work in the division. This is somewhat typical validity for a intervention research and different validity which Hammersley (ibid) for instance represents. The research is hence valid if the participants are able to further develop their activity based on the findings that a research provides; the finding is thus in a sense of generalization of the activity in the research site that illustrates central dynamics and developmental contradictions about the phenomenon.

[28] One could go one with such speculations whether another coding procedures or analytical proceedings would have been 'better'. I want to conclude that coding and analysis is always a decision between several alternatives. At the end of the day one can see whether the object revealed its true richness or not.

12.1 Nature of my findings

Does scientific ground research as an activity have clear objectives to create societal new knowledge about societal relevant phenomenon? I would argue that indeed it should provide new applicable knowledge that has use value whether pragmatic or purely ideological. Especially when it is a question about social sciences and adult education that study humans-in-society, that is, people and communities in certain contexts, the nature of scientific knowledge produced in a study should be considered. Especially, its nature from the point of view of applicability and agency is worth considering. A researcher should keep in mind that a study may provide new knowledge into different bodies of knowledge. It may be an instrument of providing novel technocratic knowledge to maintain hegemonic forces and dominant power relations in a society or it may have critical and even revolutionary value. Indeed, there is a vast amount of debate about the nature of scientific knowledge and whose privileges it serves, maintains or questions. Taking into account my study, I want to point that it also has its place in this debate. Although findings of my study are somewhat critical towards 'conventional' normative management models in administrative sciences and adult education, I sustain that I have not deliberately aimed for critical theory. The findings are novel and critical partly because activity theory looks into phenomenon of social sphere from a marginal and somewhat novel perspective. Since I have explicitly taken activity theoretical point of view as a guiding hand of my study, I assert that I have been aware about my bias as a researcher, at least in the report writing activity. I also argue that neutral research activity without any bias does not exist as such: researchers are agents in certain ideological and cultural-historical context[29], as I have pointed already.

12.1 Applicability of my findings into management?

So what about the applicability of my study? Does it create anything theoretically or practically interesting? Do these findings really matter? I claim that findings of my study have

[29] Here lies a danger of falling into determinism of strong structuralism. I argue that the agency - structure debate takes us into false tracks; instead of arguing what is the relationship between agent and structure (or oppositely) we should focus how agents themselves create historically layered and complex structures, and how those structures are transforming in collective everyday practices. I maintain that my viewpoint here into philosophy of science is activity theoretical–social constructionism (Hacking 1999) -like.

broader relevancy in adult education and administrative sciences. Especially my study questions the fundamentals of normative management theories, and positivistic organizational learning theories. It seems that up to now leadership development and knowledge management has fundamentally been to great extent based on positivistic, objectified, and individually centered notions on learning, knowledge and human activity. My study shows that a supervisor role, and leadership activity, cannot be fully described, developed or analyzed simply using positivistic predefined questionnaires focusing on social interactions that ignore activity's object and content. The context, content and object of leadership work is far more systemic, and multi-layered than any normative and positivistic explanatory model could grasp: Supervisor role is closely attached to the transformation of work content and object and their inner contradictions and tensions within and between components in a work activity.

Although my study is merely a part of wider basic research on knowledge management and a small piece in a body of knowledge, I postulate that the findings have some applicable value especially in the fundamentals of management theories, and theories about organization development. Reconsideration ought to be made about how managerial practices (leadership development, knowledge management solutions etc) should be developed in high technology organizations and what presumptions different tools to develop managerial practice preserve. High technology industry is characterized such rapid product and life cycles that readymade development solutions may fail to take into account the situation in which organizations are. Especially expansion of knowledge and work practices and social expansion of work towards networking and different kind of inter-organizational and intra-organizational partnership networks are components in the future zone of proximal development. The developmental practices should therefore take into account the future prospects of an organization at hand; development and training projects should not be based merely into how to develop and improve present work practices but should focus to illustrate the future prospects. Due to ever-rapid discontinuous change in high technology industry, developmental projects based on best practices and success stories neglect the complexity, history and interrelated systemic components of an organization and its management practices.

13.0 Conclusions about management practices in high tech organizations

To finish my study, I propose some implications and findings what my study has for management of high technology organizations and development of leadership practices environments characterized with discontinuous change in technology, products and customer needs.

1. Technology is changing and multiple platforms are being developed for multiple products. This causes pressures in leadership work both in middle-management level within supervisors as in top-management. Supervisors' role is going through transformation together with social expansion of work and expansion of knowledge and new management practices and new products. Management is historically layered and has simultaneously several historical roles manifesting in daily practices.
2. New product innovations and business innovations take place in daily practices. Part of supervisors work activity is to make on-the-spot innovations about work practices to cope with faster pace of change when new products and technological solutions are introduced into work activity.
3. Strategic planning is evolving toward a dichotomy of (1) implementing predefined, calculated and analyzed business plans, and (2) making strategic 'more risky' decisions on daily work based on future predictions of emerging new technologies and market prospects.
4. Leadership and supervisor roles are evolving more complex due to changes in (1) the object (e.g. cooperation network, customers, subordinates, top-management) and (2) content of work (e.g. emergence of new products, and evolvement of new technological solutions).
5. Because of the previous, normative and top-down defined leadership development and training modules that do not take into account the developmental phase of an organization and actual content of leaders' (supervisors') work cannot adequately meet the challenges of

developing expanding manager roles. This applies also to top-management's role, which seems to be transforming together with the object and content of work and ought to be reconsidered as well.

References

Ahonen, H; Virkkunen, J. & Engeström, Y. (2000) Knowledge Management – the second generation: creating competencies within and between communities of practice in the Competence Laboratory. In: Yogesh Malhotra (Ed.) Knowledge management and Virtual Organization. Hershey PA: Idea Books.

Bass, B. M. (1995) Theory of transformational leadership redux. Leadership Quarterly, Vol. 6 No. 4, 1995, pp. 463-78.

Bertels, Thomas & Savage, Charles M. (1998) Tough Questions on Knowledge Management. In: Knowing in Firms: Uderstanding, managing and measuring knowledge. (Editors:) Krogh, Georg von; Roos, Johan; Kleine, Dirk. (1998) London: Sage Publications Ltd.

Berger, P. L. And Luckmann, T. (1967) The social construction of reality. New York: Doubleday Anchor.

Biddle, B. J. (1979) Role theory, Expectations, Identities, and Behaviors. New York: Academic Press.

Blacker, F.; Crump, N & McDonald, S. (1998) Knowledge, organizations and competition. In: Knowing in Firms: Understanding, managing and measuring knowledge. (Editors:) Krogh, Georg von; Roos, Johan; Kleine, Dirk. (1998) London: Sage Publications Ltd.

Boland, J. R. & Tenkasi, R. V (1995) Perspective Making and Perspective Taking in Communities of Knowing. Organizational Science. Vol. 6, No. 4, July-August 1995.

Brown, J. S. & Duguid, P. (1991). Organizational learning and communities of practice: toward a unified view of working, learning, and innovation. Organizational Science. Vol 2, No. 1 February 1991.

Brown, J. S. & Duguid, P. (1998) Organizing knowledge. California management review. Vol. 40, no. 3. Spring 1998.

Davenport, Thomas. H. & Prusak, Laurence. (1998) Working knowledge: how organizations manage what they know. Boston: Harvard Business School Press.

Drucker, Peter F. (1993) Post-Capitalist Society. New York: HarperCollins Publishers.

Drucker, Peter F. (2000) Management challenges for the 21st century. Oxford: Butterworth-Heinemann.

Engeström. Y. (1999a) Activity theory and individual and social transformation. In: Perspectives on activity theory. Edited by: Engeström. Yrjö; Miettinen, Reijo; Punamäki, Raija-Leena. Boston: Cambridge University Press.

Engeström, Y. (1999b) Innovative learning in work teams: Analyzing cycles of knowledge creation in practice. In: Perspectives on activity theory. Edited by: Engeström. Yrjö; Miettinen, Reijo; Punamäki, Raija-Leena. Boston: Cambridge University Press.

Engeström, Y. (1999c) From iron cages to webs on the wind: three theses on teams and learning at work. Lifelong Learning in Europe, June, 1999.

Engeström, Y. (1987) Learning by Expanding. Helsinki: Orienta-Konsultit.

Foucault, M. (1970) The order of things. London: Tavistock publications Limited. (Originally published in French under the title Le Mots et le choses, 1966.)

Gronn, P. (1997) Leading for learning: organizational transformation and the transformation of leaders. Journal of management development, Vol. 16, issue 4, 1997.

Hacking, I. (1999) The social construction of what? London: Harvard university press.

Hamel, G. & Prahalad, C K. (1990). The core competence of the corporation, Harvard Business Review, May-June 1990, pp. 79-91.

Hammersley, M. (1992). What's wrong with ethnography: methodological explorations, London: Routledge.

Heritage, J. (1997). Conversation analysis and institutional talk. In: Silverman, D. (1997) (editor). Qualitative research, theory, method and practice. London, Sage.

Hirschhorn, L. (1986) Beyond mechanization. Cambridge, MA: MIT press.

Kuhn, T. S. (1970) The structure of scientific revolutions. 2nd edition, enlarged. International encyclopedia of unified science. Vol. 2., number 2. Chicago: The university of Chicago press.

Kvale, S. (1995) The social construction of validity. Qualitative inquiry, 1995, 1 (1), pp. 19-40.

Lave, J. & Wenger, E. (1991). Situated Learning: legitimate peripheral participation. New York: Cambridge University press.

Lave, J. (1996) Teaching, as Learning, in Practice. In: Mind, Culture, and Activity. Vol. 3, No. 3, 1996.

Leonard-Barton, D. (1995) Wellsprings of knowledge: building and sustaining the sources of innovation. Boston, Masachusetts: Harvard Business School Press.

Leontjev, A. N. (1977). Toiminta, tietoisuus, persoonallisuus. Helsinki: Kansankulttuuri Oy.

Maanen, John van. (1979) The Fact of Fiction in Organizational Ethnography. In: John van Maanen (editor). Qualitative methodology. Administrative Science Quarterly 1979, vol. 24.

Magalhães, R. (1998). Organizational knowledge and learning. In: Knowledge in Firms: understanding, managing and measuring knowledge. Krogh, G. v.; Roos J; Kleine D. (editors). London: Sage Publications Ltd.

Malhotra, Y. (2000). Knowledge management and new organizational forms: a framework for business model innovation. In: Yogesh Malhotra (Ed.) Knowledge management and Virtual Organization. Hershey PA: Idea Books.

Mannheim, K. (1936). Ideology and utopia. An introduction to the sociology of knowledge. New York: Harvest Book.

Mishler, E. G. (1984). The discourse of medicine: dialectics of medical interviews. New Jersey, Ablex publishing corporation.

Morgan G. (1995) Images of organizations. Thousand Oaks, CA: Sage Publications.

Nadler, D. A. and Tushman, M. L. (1995) Types of Organizational change: From incremental improvement to Discontinuous transformation. In: Nadler, D. (1995) Discontinuous change: leading organizational transformation. San Francisco: Jossey-Bass Inc., Publishers.

Nadler, D. and Shaw R. B. (1995) Change leadership: core competence for the twenty-first century. In: Nadler, D. (1995) Discontinuous change: leading organizational transformation. San Francisco: Jossey-Bass Inc., Publishers.

Norhouse, P. G. (1997) Leadership: Theory and practice. London: Sage Publications Ltd.

Nonaka, I. & Konno, N. (1998). The concept of "ba": Building a foundation for knowledge creation. California Management Review, 40, 40-54.

Nonaka, Ikujiro & Takeuchi, Hirotaka. (1995) The knowledge creating company, How Japanese Companies Create the Dynamics of Innovation. New York: Oxford University Press.

Potter, J. (1997). Discourse analysis as a way of analysing naturally occuring data. In: Silverman, D. (1997) (editor). Qualitative research, theory, method and practice. London, Sage Publications, Inc.

Schwandt, T. A. (1998). Constructivist, interpretevist approaches to human inquiry. In: Denzin, N. K. & Lincoln, Y. S. (editors) The landscape of qualitative research: theory and issues. London, Sage Publications, Inc.

Schein, E. H. (1996). Leadership and Organizational culture. In: The leader of the future: new visions, strategies, and practices for the next era. (editors) Hesselbein, F; Goldsmith, M; Beckhard, R. California: Jossey-Bass Inc.

Schutz, A. (1967). Collected papers I. The problem of social reality. Netherlands, The Hague: Martinus Nijhof.

Silverman, D. (1993). Interpreting qualitative data. Methods for analysing talk, text and interaction. London: Sage Publications, Inc.

Spender. J. C. (1999). Competitive Advantage from Tacit Knowledge? Unpacking the concept and its strategic implications. In: Organizational learning and competitive advantage. Bertrand Moingeon, Amy Edmondson (Editors). London: Sage Publications.

Tuomi, Ilkka. (1999) Corporate Knowledge. Theory and Practice of Intelligent Organizations. Metaxis. Helsinki: Hakapaino.

Venzin, M.; Krogh G. v. & Roos, J. (1998). Future Research into Knowledge Management. In: Knowing in Firms: Uderstanding, managing and measuring knowledge. (Editors:) Krogh, Georg von; Roos, Johan; Kleine, Dirk. (1998) London: Sage Publications Ltd.

Vermaak, H. & Weggeman, M. (1999) Conspiring fruitfully with professionals: new management roles for professional organizations. Management Decision, Vol. 37 Issue I, 1999.

Victor & Boynton. (1998) Invented Here, Maximizing your organization's internal growth and profitability. A Practical Guide to Transforming work. Boston: Harvard Business School Press.

Virkkunen J.; Engeström Y.; Merja H.; Pihlaja J. & Poikela R. (1997). The Change Laboratory – tool for work renewal. [(In Finnish:) Muutoslaboratorio – väline työn uudistamiseen. In publication: Työelämän innovaatiot - väline kilpailukyvyn, hyvinvoinnin ja työllisyyden edistämiseen. Kansallinen työelämän kehittämisohjelma, vuosikirja 1997, raportteja 2. Oy edita ab, Helsinki 1997.]

Vygotsky, L. S. (1978) Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.

Wenger, Etienne; Snyder, William, M. (2000). Communities of practice: the organizational frontier. Harvard Business Review: Boston; Jan/Feb 2000

Wenger, Etienne. (1998) Communities of Practice: Learning, meaning, and identity. Cambridge: Cambridge University Press.

Zack, M. H. (1999). Developing a Knowledge Strategy. California Management Review, Vol. 41, No. 3, Spring, 1999, pp. 125-145.

Zack, M. H. (1999b). (editor) Knowledge and strategy. USA: Butterworth-Heinemann publ.

Zuboff, S. (1988). In the age of a smart machine. The future of work and power. New York: Basic Books, Inc.

Unpublished references:

Ahonen, H & Virkkunen, J. (2000). Knowledge management as creative dialogue about the future. Paper presented in Sao Paolo Conference, 16.7.2000.

Virkkunen, J. (2000b) Two theories of organizational knowledge creation. Manuscript.

Appendix A: Supervisors discussing about their role

The first excerpt is from a discussion from the second meeting in which supervisor's historical role and its present day manifestation were analyzed. However, also actual empirical analysis occurred. Excerpt also clarifies that the speed of change is present in their daily work causing disturbances: (Second competency laboratory session (10'30-):]

Discussion:
1 Interventionist: "How would you now outline your own role? There before you told, that you didn't do much of any decisions but what is your own role in this change (organization & leadership change)?"
2 Supervisor1: "I suppose it is the making of that change."
3 Supervisor2: "Taking the responsibility is surely one."
4 Supervisor3: "Changing course of our subordinates."
5 Interventionist: "What has been your most important means to do that?"
6 Supervisor5: "See customers' needs, make visions."
7 Supervisor2: "It is difficult to understand if you don't stand behind that yourself."
8 Supervisor4: "Those who have not understood that [importance of customers] are not here anymore."
9 Interventionist: "So you mean that your own change has been the driving force in it?"
10 Supervisor3: "Well and then there is that we deal with the administrative level of our division and also with upper executives a bit, so we see how they think. Then we deal with customers, and see how they think. Then we also deal with many subordinates and see how differently even they think –making use of this knowledge and then applying it in our own activity and taking into account all this viewpoints."
11 Supervisor6: "And still we don't know all things so well we should."
12 Supervisor5: "The top managers of the company (strategic management) have given those directions, that this is the direction we go; and then it slowly drips down stair wise."
13 Interventionist: "So you would say it's more obvious now?"
14 Supervisor5: "Yes."

The following excerpt is taken from the discussion on supervisors' relation to management from the third session. The historical causes and their present day manifestations in the supervision model are examined. The excerpt from that discussion shows how learning actions 2A and 2B interact (analysis of historical model and its present day manifestation):

Table 4 Quote from a discussion on past and present relationship of supervisors towards the division management. [log note: third meeting 10'23-].

Discussion:
1 Interventionist: "So what was management's role before and now, and supervisors role in relation to that before and now?
2 Supervisor1: "Management convention before, year budgets and budgets were made."
3 Interventionist: "You talk about management?"
4 Supervisor1: "Yeah, about that management. They made budgeting and year budgeting, and things were same, figures just changed every year –increased (…)."
(…)
10 Supervisor1: "Yeah and growing." (several supervisors mentioned this simultaneously)
11 Interventionist: "From supervisor's point of view the past time; what did you do in relation to management?"
12 Supervisor1: "Delegating happened more upwards, and these positions were sort of like hierarchical, much more clearer then: engineers just did their job and supervisors did their. Delegating was even upwards; those decisions were not necessarily made though organization was left to do their thing, shrew their stuff. Workers were not necessarily listened or discussed with, but at the background there were a strong labor union, really strong..."/ (other supervisors interrupts)
13 Supervisor2: /"...that crushed when it wished; those kind of real major decisions were made by the labor union management."
14 Supervisor1: "Yeah, otherwise nothing happened."
Interventionist: "Well what is the situation now? What does the management do and what is your role?"
15 Supervisor1: "Actually the profitableness has become important, that is, following results. The objective is in the future while before it was in present time or in the past."
16 Supervisor2: "Results or out; it is that kind of system, always must come results."
17 Supervisor1: "The quality of customer service is one important. And then that the top management is more busy now, one must reserve an appointment if wishes to go discuss."
18 Interventionist: I hear here these year budgets; this profitableness (kannattavuus) and customer service. This has happened so that thinking is longer oriented. It has changed that way the rhythm as well. Is there still (something else)?
19 Supervisor2: "The discipline is more stronger, partly of course because this is kind of continuous dropping game,"
20 Interventionist: "What discipline you mean?"
21 Supervisor2: "Well generally everything, punctuality, one must be on time in the meetings, papers must come in time."
22 Supervisor1: "The meetings have tripled."
23 Interventionist: "What about your (meetings and work), how does this relates with management from your point of view?"
24 Supervisor1: "It is actually so, that we hold more meetings and obligate staff."
25 Interventionist: "It has changed into running more meetings?"
26 Supervisor2: "Yeah, and more like a coach-like work".
27 Supervisor1: "And involvement (commitment)."
28 Supervisor2: "So before we had [less] meeting[s] a year, and last year there were [more] (…)."

29 Supervisor1: "Delegating downwards, responsibility is given downwards in all (managerial/hierarchical) levels."
30 Supervisor2: "Yeah, and lot of making all kinds of reports."
31 Interventionist: "What tools you have in supervision work in relation to top-management?"
32 Supervisor2: "It is that PC an important tool, and team-mail and data searching."
33 Interventionist: "What used to be the cooperation figure before? What were those forums before?"
34 Supervisor2: "They were those kind of unofficial coffee breaks in the morning, just this kind of 'ex tempore' things."
35 Supervisor3: "And he (division chief) was always present; now when you look, there is nobody there."
36 Supervisor4: "We don't have no more that warm relationship towards division chiefs, it has become more official."
37 Supervisor2: "Yeah, it is official (the relationship.)"

The quote consists of questioning (learning action 1) and actual empirical analysis (learning action 2B) on division of labor between supervisors and dispatchers, also rules are present in the extract. This discussion emerged while the participants were reading a feedback summary that interventionist had prepared beforehand (log time: third meeting 9'44):

Discussion:
1 Interventionist: "How do you hear this (referring to subordinate feedback), that dispatchers get to do lot of that kind of job what supervisors do? How do you see this dispatcher surface in your work?"
2 Supervisor1: "I'd say that during this change what has been going now in the 90's from this traditional supervision role into this present model; so it is that we have all the time brought, sort of moved, this decision making downwards. These so-called routine tasks have moved for dispatchers to do. And I think it has succeeded quite well, and one doesn't have to in every detail -when they have given the borders for all supervisors until what they can go into, so this has functioned. As an example I can give a decision about a free day to somebody; they don't have to come to ask from me, since I have to ask anyway from the dispatcher about what's the situation (in capacities and queues etc.): S/he can give that one free day, or tell that one can have it!"
3 Supervisor2: "It is the same if there is a customer reclamation about something, say, how much of that work was done and what was the price. If the dispatcher can instantly tell to customer that this was the case, so then the customer is much more satisfied -if it would be that s/he (customer) should start calling to different instances telling the same things over and over again. So, it (decision-making process and decision-making power) has to go much nearer to customer surface. Maybe that is why the field personnel feel that supervisors aren't necessarily needed since this dispatcher is making the decisions."
4 Interventionist: "Because s/he (dispatcher) is nearer to them."
5 Supervisor2: "So they have gained lot of more so-called 'power' here during 90's since it helps a lot of our job when we don't need to always deal with those small things, since our job is that background work anyway."
6 Supervisor1: "It is this kind of flexibility; when all workers have gained more flexibility, so here employer has increased flexibility towards workers."

Following excerpt is from a discussion from the fifth session, in which the present supervisor model is analyzed (learning action 2B):

Discussion: (from 5th session)
1 Interventionist: "How would you name this, if you should give a name with a word or two for the 80's model and for this present? What was the supervision model then and what is it now?"
2 Supervisor1: "It was meant to be anyway, that supervisor became this kind of a coach. I don't totally agree that it has become such, cause now it has become more these kinds of supervision tasks that it was then. These sort of one could say like supervisor-like but sort of like activity connected with other organization and other activity."
3 Interventionist: "So that coaching refers like more to that what used to think that you direct yourself more into your team. But then it has happened that there are everything else concerning this organization?"
4 Supervisor2: "It showed that way because of that we based those small groups; there is coach and ten people, and we thought that in that one can easily implement this beginning of change. And yes it went quite well. But then just time changed it and we noticed that it's not economical and we had to enlarge groups. The beginning was this kind of ideal thinking, that it would evolve this kind of coach organization; it's somewhere there, it's not the past but it's not the coach organization either."
5 Interventionist: "So your objectives was this kind of coach-model? But in reality, what is this real model now if it's not the coach model? How would you name this new one?"
6 Supervisor3: "Creator of possibilities, enabler."
7 Supervisor4: "Being everywhere."
8 Interventionist: "Being everywhere would describe that, creating possibilities everywhere."
9 Supervisor5: "There in the beginning it was a meaning that this group (...) but then when this area enlarged it was economically (...)." [(...)= words unclear on videotape]
10 Supervisor1: "If that group would be smaller, like it was originally ten people and the area would be smaller, then it would be damn good; everybody would meet every morning."
11 Supervisor4: "There wouldn't be much of jobs."
12 Supervisor1: "Designing that day, like they say that teamwork is easier to have with such a group that works in a same place, like in a factory or in a shop. It's damn clear that when they meet in the morning and deal with that day's work and talk about all these things briefly. Also we when we organize these team meetings, and when it's like my group who is in charge of the whole area, so it's quite a big take off from the job."
13 Supervisor4: "It takes a half day."
14 Supervisor1: "And when you organize it once in a week or in two week, so there are lot of those things and they just get even longer. So that if one could deal with those issues every morning when they meet, it would not be that long cases."
15 Supervisor5: "One thing that has clearly showed up here is that capacity planning, it's not up there (refers to a wallpaper that describes the older supervisors model - 'up'- and current model and zone of proximal development -model). That belongs also, it's really essential.
16 Interventionist: "So it's like sort of couple of months aim of taking some steps (refers to the same wallpapers as previous speaker) that something has changed here. Do you have some kind of image, that if one would say with a couple of word, that from 'being everywhere into (what it has changed)?
17 Supervisor1: "General worker."
18 Supervisor4: "Multi-worker, common worker."
19 Supervisor3: "General man."

20 Supervisor5: "It's really an objective that we would become real human resource managers. That's our job. I started to think what does this mean; thing that we still have leftover from that old master. We should everybody understand this thing that we really are human resource managers. What does it mean? It doesn't mean that we manage work out there. We manage these people. That is surely the thing that will be the real model in the future also, human resource manager.
21 Interventionist: "So you assume that -when we here spoke that this (refers to model on wallpaper) spreads on different directions, that the future is like orienting towards the team?
22 Supervisor5: "Yeah, it doesn't have to, team can be spread. But you need to like more manage those people and adjust that supervision model into, that you can manage these people; that people (staff) really do, give responsibility to them still more, so that they do that job. And take care that they have that competency and know-how and that you make it possible, that they have resources. You really manage people, not work.
23 Interventionist: "Do you (refers to other supervisors in the laboratory) agree, do you have some other nuance here what this objective (object of the supervision model) is?
24 Supervisor1: "Yeah, I'd say it's towards there as well. There is one thing that has occurred to me with customers once, that our title is supervisor. That customer called me and wanted complain about something, but it didn't want to speak to me but to my chief. Then we spoke with the former division chief that is our title correct, that it's supervisor: it feels that this customer would like to have somebody with a higher or better title. When we named these whoever to chief that now we'd have like some title that would give a better picture to customer as well that now there is an important enough person on the phone."
25 Interventionist: "So is that we're looking for/"
26 Supervisor1: "/Customer service chief, isn't T such?"
27 Supervisor5: "Well, service chief."
28 Supervisor1: "Service chief yeah."
29 Interventionist: "It would fit better to you as well?"
30 Supervisor1: "Well maybe it would tell more to customer also that what's going on. Supervisor is considered still like a former master."
31 Supervisor5: "Well it isn't really a service chief."
32 Supervisor1: "Well, no but..."
33 Supervisor4: "But quite badly it fits with that human resource manager -chief of supervision- picture: the daily work is still [routine tasks] (...) Handle with all these dull daily things."
34 Supervisor1: "Things were nice when we started these, but the reality isn't that."
35 Interventionist: "Actually you carry with you those old tasks."
36 Supervisor1: "Yeah, so we still have those old tasks, but beside that we've these new; economic stuff and telling those to teams and managing teams."
37 Supervisor5: "That what I exactly meant. I said old human resource manager and old supervision; we must leave those old models behind –those what we do right now. I argue responsibility -for example when you mentioned broken tool (refers to bureaucratic guidelines when e. g. a tool is broken it has to be applied rather bureaucratically from the warehouse), why is it so? It's because people are afraid that they take those home/"
38 Supervisor4: "/Yeah."
39 Supervisor5: "This kind of model must be vanished from it. That kind of responsibility must be given that if one has a broken tool so he goes to repository and gets one; he has it there with personal name, and we get the bill and see it then. These kind of driving reports and stuff, we can put them into some place. This is something we must get off here and now settle these things out, so we really spare time to think how do we go forward with people."

The following excerpt is from a discussion from the fifth meeting in which the homework of coming up with change ideas was discussed and in which this new, rather potential, idea of central competence center emerged. This excerpt is also a manifestation of a fourth learning action, clearly this quote includes some examining of the new model:

Discussion (5th session):
1 Supervisor1: "Then I've written here that there would be central competence center."
2 Interventionist: "What is it?"
3 Supervisor1: "That we supervisors wouldn't have to get into these problem situations more. That there would be centralized place where would be these problem solvers. It could be from the existing group that new personnel aren't necessary to take; but some employees more would be okay. But those technical things would be solved there."
4 Supervisor2: "Yeah, that's it."
5 Interventionist: "Is it like sort of help desk?"
6 Supervisor1: "Well sort of like that but not necessary like customer help desk, but staff's support center."
7 Supervisor2: "There evolves similar technical problems and everyone deals with them with their own way, but if there would be somebody in the centralized (competence center) who would deal with the problem and find solutions and would order things into warehouse and tell that this is the way to do it."
8 Supervisor1: "And since it would be centralized everybody would know those problems; nobody wouldn't hit their head into walls in different parts of area, other in the west and other in the east."

During a discussion on change idea 2) planning of meetings in the division following issue emerged, that illustrates rather well the changing object of supervisor work activity. The excerpt is obviously clearly a 3rd learning action, modeling of the new solution and a specific tool (meeting planning) within it. Notwithstanding, it also includes some examining of the new model, since after all the change enterprises represent components from the new model.

Discussion: (5th session)
9 Interventionist: "So what about you, do you still have some (change ideas)?"

10 Supervisor1: "I was thinking this matter quite far –that we'd be more like personnel managers and through that gain customer satisfaction. For example this kind of competence center or team meeting –wait a second, how should I say it? Well anyway I thought about like it could be like we have that production meeting, it could be similar which would have a mate from each team. One thing that should be decided is that team meeting shouldn't be longer than two hours. We have these like bigger meetings every now and then, we have business meeting responsible and production team and stuff, but we would have like team meetings where members from teams would be with –supervisors and team members. So like each team would have so called leading man from it. Team would choose a fellow among them, who would take a message from here to there, and we would discuss here on all things then; and it would be decided that we'd do like this. There was some talk that team doesn't know: one acts like this and another like this. So this team's message-man would take this announcement to team there."
11 Interventionist: "That's a good point, how would you itemize that?"
12 Supervisor1: "Well let's say when we think of these team so they typically have a team leader. In our place, it's rather miserable, we've not succeeded in organizing such a team: in a factory one can organize such a team but which always has a team leader. There's always somebody who'd like to act as the foreman. The group would choose one and he would be like once or twice in a month, whatever needed. This kind of a small meeting where they bring their issues and really there would be no other topics than those brought beforehand."
13 Interventionist: "So a common effective team meeting is that idea? That there would be supervisors and this like courier?"
14 Supervisor2: "There it might happen that this kind of system might come up that these team couriers would want more salary?"
15 Supervisor1: "We would say, that they would not get more salary, that it's like normal work. It's our supervisors duty to say, since we get our money from working."
16 Interventionist: "It can be like going round?"(the one who is participating changes)
(…)
18 Supervisor1: "Yeah, no. It's chosen among them."
19 Interventionist: "Did you have something else? (to say on change enterprises)"
20 Supervisor1: "Well that we as supervisors are not human resource managers, we're on our way to somewhere, but we should throw of that old bag from our shoulders; this is the old that we don't do anymore."
21 Supervisor4: "This presupposes that you take of those useless jobs and go talk to the field."
22 Supervisor1: "It's lot of talking, that you're dealing with people. That what it is greatly, through that you really get people involved. But we don't have time to that. There in your interviews there was that we're here like on a wire and we're not there (in the field) meeting them. It doesn't necessary have to be about any technical matter but just to talk about daily issues, and that I could tell like where we are going. It's like continuous developmental discussion. And then I wondered that when we get good feedback; some of our subordinates gets positive feedback and then comes these claim issues. So always we'd have a developmental discussion there instantly. Have it really in such a manner and to tell to this person in whom you've got good feedback and in which negative; and find from these what one would learn. Otherwise, you cannot take that outside. That's one subject in personnel management.
23 Interventionist: "Do you mean, such an instant feedback?"
24 Supervisor1: "Yeah, the person sees immediately if he does something wrong and it can be discussed there instantly. It goes straight and it doesn't repeat, and a thank for a good work immediately."

25 Supervisor3: "For me just that developmental discussion brings something that since now this framework is fixed about how questions are and how you discuss about them and what time of the year. If that's under control, if it's done all the time, then one could do it throughout the year with one's own timetable, and not to talk merely about those things mentioned in that memo. It seems that it's like too complete. Since now we can it we could like little bit take some sidetracks."

Later in the discussion on team meetings (new model's change idea 2), and other meetings in the division, it occurred that one supervisor actually already has 'courier' meeting as described in the quote above. This tool or innovation is a germ cell (Engeström 1987) that implies a new tool in a emerging new activity:

1 Supervisor1: "I argue that we should still use these actors, that is field personnel, when something new is presented. What does it feels like, from the field's point of view; there might come up relevant hints how to develop things, since they now the problems already in advance there; and how it might work and how not."
2 Supervisor2: "Well I have this spring such a group, in which belongs dispatchers, four installers and myself. Every other week we go trough all these. It's called work and productivity development meeting. Next time we'll see how the summer vacations match. They like it. We see how it will go until end of April and what do they think of delivering times, what they think of problem correcting speed.
3 Interventionist: "So it isn't like one member but like this kind of squad team?
4 Supervisor2: "Yeah. You get a diverse picture, dispatcher's viewpoint, and installers viewpoint."
5 Interventionist: "How often do you keep them?"
6 Supervisor2: "Every other week."

The following quote is excerpt from a discussion on this vision model during which several learning actions took place. It is again an example of a small-scale innovative learning cycle. It proceeded flowingly: a) the new model (supervisors' new role) was analyzed and proposed alternatives were discussed, and b) model was concretized and concrete implements were planned:
(Quote from the sixth meeting from a discussion on the vision model, 10'00'':)

Discussion:

1 Interventionist: "Is here really slowly evolving some kind of role shift into some direction? That delegating (change idea on delegating of meetings etc. that came up in the fifth meeting) showed that nothing too quick is not happening, but sort of all the time creating possibilities that in the customer surface would happen more and pressure from dispatchers and you would be going off. So what does it open (=solve, that is, the change enterprise on delegating tasks), this is all necessary, but so what? If you don't become coaches even with that technological leap, then what is that role of change management and high technology management and subordinate management? What is happening here now, and into what does these lead us, delegating and training (refers to two of the change ideas mentioned earlier, 1)= delegating and 2)= gaining more/new competency and technological know how for the supervisors)?"
2 Supervisor1: "That role of supervisor has become more closer to user engineer's job, he sits here at the office and uses those sheets that user engineer in the past planned those next season objectives. For me it seems that it's going more and more into that direction."
3 Interventionist: "Towards user engineer?"
4 Supervisor1: "Whatever the title but into that direction."
5 Division chief: "You pointed into that title. By no means underestimating the title of 'supervisor', I'd say the association is false; supervises work, therefore supervisor. That what we have to anyway put some effort into, is to that we manage and take into account those people who work: none of us can that technological know how that some of our best fellows individually have. So that if such values can be found I would gladly take signings up. To my mind, the starting point is that we don't have to start competing in it. I mean that kind of management in which I ought to know what is the latest functioning user interface, when we have here 200 people; So it is a slightly perverse solution when - and therefore that opening speech of Hannu (development chief gave a speech on supervisor's technical competence at the beginning of the meeting, see this study's introduction) is quite welcomed question to all of us. When one has to suffer with that one's own people know more about certain things, and then one should manage them into such direction that they would know more. And relevant is that deeper they go in those separate know-how the greater is the risk that they loose that actual objective from their sight. We must take care that the objective is clear to them and as close as possible. I believe that we are going towards such an ad hoc organization; tremendously high educated specialists."
6 Interventionist: "That is quite describing what came up there. I collected those tools here (she refers to a wallpaper into which she has written a vision model using structure of activity); development dialogs are important in that delegating, that sort of those people who are willing ('good and active workers') are being searched. Then there are different kinds of visions. Then in P's group you talked about customer classifications; we have to little bit see into what kind of segments they divide. Customer satisfaction questionnaire was in that same place. Then this was developed what kind of measuring tool you need, to follow that development of competence; balanced scorecard, different kind of meetings: none of those are now the same management tools what they used to be. That toolkit (refers to different management tools and means), doesn't it describe quite well that your most important tools are like these: they are not intervention with supervision but these kind of measuring tools, following, and discussion, and grouping of different things so that one can supervise. But have you Hannu come up with any ideas here on this, that what is this leading idea behind that training you have designed? Is it this kind of user engineer versus chief of specialists?"

7 Development chief: "I was about to use an expression that training's (education) objective would be from technician to engineer, but I didn't say it aloud. But I had that sort of an idea, but like not an engineer in that way that one could those details, but in a way that the objectives would be to guide the people until the beginning of a next path. That those principal concepts of digital IP-technology would be opened. After (the training) when all the fellows read technical magazines and else, they could update themselves; similarly as they've maintained skills in analog technology: Everybody has learned that (analog tech) in technical school and after that everybody has kept oneself updated, but here it has been such a big change that one should like give new tools at hand. I don't know what is it about that role's point of view, but possibly it's changing something from coach to supporter; sort of supporter role or like that."
8 Supervisor3: "That is just what makes this management so complicated nowadays; our staff is so splintered, others [need more help] and others are tremendously independent and do whatever. The supervisor role cannot be that undirected either. I would agree that let's forget that everlasting equality, that everybody must have a laptop or that everybody must get similar things. But let's go into that let them develop who have qualifications into that and let's forget those who cannot develop anymore.

The following discussion is from the sixth meeting, during a discussion on the first change enterprise, **delegating**. It demonstrates especially the need to cut of supervisors' certain irrelevant daily tasks. Moreover, it highlights the importance of customer relationship as the object of supervisors' work. Also, examining of tools in the new model continues here. The following extract also implies emerging of new object (customers) in the new model. Moreover, this excerpt is a product and manifestation of fourth learning action. **(sixth** meeting 8'16-).

Discussion:
1 Supervisor1: "Training the field personnel to use data systems, that leads to customer service and greater satisfaction and effectiveness."
2 Supervisor2: "There's similar idea if somebody's been in fast car repairing: there that installer first does his job with his dirty hands and then goes to computer, picks up those extra pieces, picks up the average work time and then prints you the bill. He doesn't call to any dispatcher who would write the bill. It's somewhat alike. Similarly, if the customer asks so he can check immediately that it costs this and this much –and doesn't call to anybody.
3 Supervisor1: "This delegating can decrease supervisor's work tremendously. (…) It would come that competence there, that they could do one task as a whole when it would become more effective and definitely would also improve customer satisfaction and maybe that it's more broader would also feel better for them –hopefully like that."
4 Supervisor3: "This is just it, more autonomy below. Usually installers don't leave visiting cards, it's still such matter that everybody doesn't understand. Customers cannot call directly to them."
5 Supervisor1: "They're just for that purpose, that may be directly called, and not to pressure supervisors."
Discussion:

12 Division chief: "All installers do everything. People are not similar, even the customers are not similar. I would prefer such a course that person carries the responsibility and carries that customer interaction from the beginning until end as possible. It's always better and more personal that service to the customer than if somebody more or less anonymous would deal with him or her in a centralized manner and often afterwards because of the big volume. Shall we start from that those who we see that have the ability to deal with the customer to the end and those janitors that especially want this kind of fast feedback so let's start this experimentation with them. Now during digital technology, we would have also other options than mere null or one. Because as a direction of development is totally correct. That example of car repairing (see elsewhere here previously) is good and preferable direction. But we're not simultaneously, that we have more critical customers janitors/house caretakers who aren't always there. It may be that there're individuals among us who'll never have such competence, but let's not stop this good direction because of them; let's start with them who are able to that."
13 Supervisor1: "I didn't really understood what this has to do with delegating?"
14 Division chief: "This has maybe more something to do with sharing worker responsibility, do you agree it that way?"
15 Supervisor1: "Yes."

Following excerpt is from sixth session, from a discussion of change idea, meeting map, which concerns division's meeting planning. It is again a manifestation of fourth learning action from the sixth session:

Discussion:
1 Supervisor: "So then we get sort of, by taking those similarities off from there, some kind of our division's map of meetings, from which everybody knows what meetings we have here and who belongs to them."
2 Division chief: "That's good, could you secretary (refers to one of the participants who is writing down the ideas on wall paper) write down meeting map. That probably means that there is some kind of overlapping between those meetings. And in every meeting - circle on the map - includes the participants, in principally topics of the meetings, and information on is it information sharing, designing or implementation meeting."